MODEL AIRPLANE NEWS

DECEMBER 1953—25 CENTS

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3. 90° turn left
4. 270° turn right
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7. Figure "8"
8. Rectangular pattern
9. Spot landing

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1. Unassisted R.O.G.
2. 500 ft. cross country
3. Wing over
4. Immelmann
5. 3 consecutive loops
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7. Spiral dive
8. Touch and go
9. Precision landing
10. Spot landing

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Convair B-36 Bomber
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Transport
Northrop F-89 Scorpion
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Grumman F9F Panther
Fairchild C-119 Packet

25¢ and 50¢ kits have plastic canopy and prop disc.

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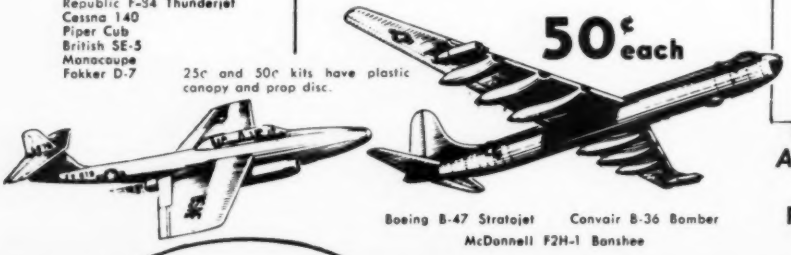

Boeing B-47 Stratojet Convair B-36 Bomber
McDonnell F2H-1 Banshee

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STANDARD OF THE MODEL WORLD

MODEL AIRPLANE NEWS

25th Year of Publication

DECEMBER 1953 Vol. XLIX—No. 6

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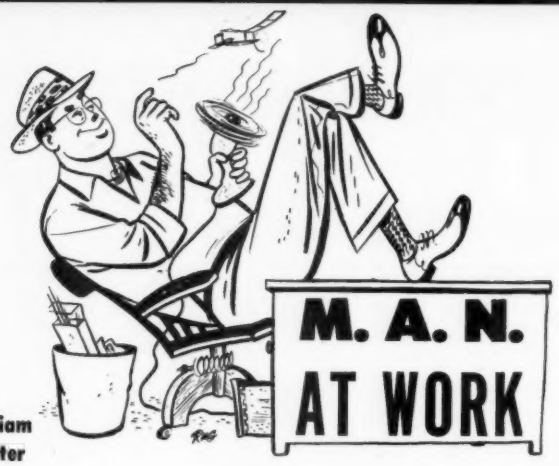

by William Winter

One of the more serious drawbacks of the Nationals in recent years is the streamlining, or package dealing, of the trophies. There was a time when the great name trophies held meaning and inspiration. Like winning the Wakefield, you knew you'd made the grade when you won them. And, in those days, the magazines competed to publish plans of, say, the Texaco Trophy Winner, the Mulvihill, or the Moffett. But the modern philosophy that every entrant (almost 50 per cent) should go home with something or, as is the case this year with a certain other great contest, that entrants must be hand picked for publicity value to the sponsor, has demeaned the value of winning, except to the winner's family and, perhaps, a few friends.

On page 24 of this issue, Christy Magrath (who has been building models since the days of the Wrights), describing the first Mulvihill contest, in 1923, quoted from the program, "... should be a tremendous stimulant to the youth of the country in building model planes ... should bring out new features in model airplane design which may conceivably have an effect on full scale production...." Since the fate of the Mulvihill Trophy points up the decline of the prestige that once went with winning the more important events, it could be the rallying point to restore that prestige to the Nationals.

It may be argued that the annual repair of special trophies is a difficult and costly task. Or that the Mulvihill, for example, was given originally for the longest flight in rubber. If such a trophy has historic value, leave us not quibble about repair. That value will be realized if we stop awarding such trophies as an afterthought, as an extra or unexpected piece of hardware to take home. Because it was awarded for the longest flight *(Continued on page 4)*

PLANE ON THE COVER

To cover artist Jo Kotula, the Avro CF-100, twin jet, all weather jet fighter, is a silver streak flashing across the Canadian skies it was designed to defend. Distinguished by the odd location of its Orenda turbojets, on the wings but against the fuselage sides, this powerful jet is two place. The pilot and radar man are tandem seated in a pressurized cockpit. Weights and performance figures have not been released nor are the armament details public knowledge. Span, however, is 52 ft.; length, 52 ft.; 6 in. Has tricycle gear. Ship is in production.

NEXT MONTH'S COVER

The Curtiss F8C-7, or Helldiver, began life as a two-seat carrier plane. Its nickname came from the then vaunted ability to dive vertically with a full load of bombs. Pilot and gunner rode in the classic World War I arrangement, with the rear man expected to swing his gun in the slipstream. Spread of this equal-span biplane was 32 ft. Had "big" 575 hp Cyclone.

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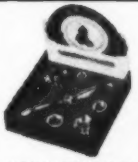

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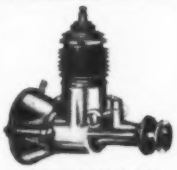

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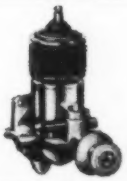

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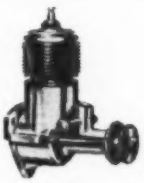

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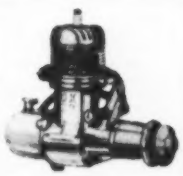

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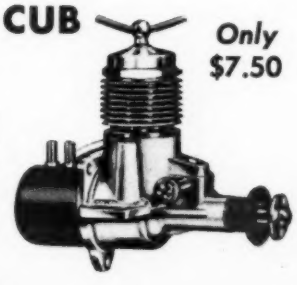

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TD-1—TWO-MINUTE ASSEMBLY KIT for those who like to "build their own", including SPACE BUG .049 engine, less accessories. Beautiful 25 inch gift box $15.95

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Man At Work

(*Continued from page 2*)

in its event (it didn't even go to the winner of the event), the awarding of the Mulvihill amounted to nothing more than acting out the duty to give away a now unwanted trophy.

If the original purpose of this trophy was to stimulate interest, and contribute to airplane design, this award should be given to the winner of some event that fulfills such a purpose. Would it compromise Pan American to so award the Clipper Cargo winner; or the Navy, for the carrier event winner? At least, make it the big award in some lasting event. If permission is needed, get it. The spirit and implied purpose behind the trophy, so clearly identified in the 1923 program, is a better guide than chance wording which no longer fittingly applies as the result of changes in the past 30 years.

Modeling needs clear-cut and worthwhile goals to compete for, such as the Wakefield, FAI Gas, Swedish Cup (Nordic), the Mulvihill (now a trophy without an event), and others that could well be added in place of the serried ranks of glittering but virtually anonymous brass. Prestige is so lacking that a youthful winner of one of the biggest (physically speaking) trophies at Willow Grove objected to having to carry it home.

* * *

Got together with Bill Effinger and Joe Dale to review trends in RC at the Nationals. Seems Berkeley has an important radio item coming up. Joe had electric powered boat for testing this equipment on vacation this summer. Meter mounted on the cabin side. Read it with binoculars during the "flight." Bill and Joe got off a duet on the Hammond organ—oh, brother! Strange rhythms kept coming from Joe's end of the keyboard. Suddenly realized it was an SOS in code! That got us down to a running discussion of sport cars, real and model; helicopters, jets, and just about every other facet of modeling.

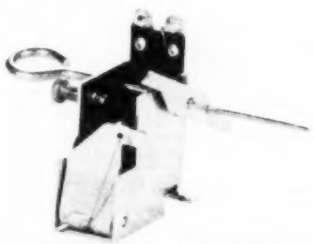
Been doing this for well nigh on . . . how many years? The first time we met "Ef" was in an elevator up to the old Flying Aces office, in the fall of 1932. Bill had a tale of woe. The guy who had to finish a model for the Christmas ad had fallen asleep while bending bamboo. As oldtimers will recall, you used the heat of a candle flame to do the bending. So the model burned up. Business was simple then. As just another modeler, Bill had lived on a street called Berkeley Place—the name sticks 20 years later though the factory today is miles away. After school other modelers would drop in and try to buy missing sizes of wood. One thing led to another. That was during the tag end of the depression. Remember yakking with Bill one night shortly after he took up engineering, and the subject was the proper disposition of structural members in the Buccaneer which later became a kit. Bennie Shereshaw, later to manufacture the Bantam engines and operate machine shops, wanted to trade Bill his Cavalier design. Remember Bill in 1936, or was it '37, at Handley Field, with an autogyro that took first in the Eastern States Gyro Event. It cracked up but nobody else could do anything. So Saturday we are going to attend another one of Bill's inspirations, a hydro meet for radio, payload, free flight, and what have you, on Long Island Sound. As long as this fellow stays around New York, modeling will never be monotonous. Our secret ambition is to see Jim Walker, in Man from Mars helmet, flying three Fireballs at once from the deck of the new Chris Craft flush deck carrier Effinger is having built in the Don McGovern "ship yard." So three cheers for Berkeley and Bill on the company's twentieth anniversary. May the next 20 be just as much fun.

(*Continued on page 8*)

TRADE SHOW

MONTHLY REVIEW OF NEW PRODUCTS, OTHER INTERESTING ITEMS WORTH ATTENTION

▸ *Aeronca Sedan* and *Piper Cub:* Monogram's famous scale controlline kits once again are part of Chicago firm's line. Spanning a hair less than three feet, kits feature familiar Monofoil wing and Monofuse fuselage. Both kits are good subjects for the flying events that will be held next year.



▸ *Escapement:* A low cost, precision built escapement, introduced by Citizen-Ship Radio Corp., Indianapolis, weighs 1/2 ounce and has a battery drain of 300-600 ma., depending on voltage. Excellent feature is use of heavy shaft and bearing, eliminating slop and consequent failure.

▸ *Super Zenith:* For Class A stunting, engines of .099 to .16 cu. in. displacement, prefabricated kit by Enterprise Model Aircraft Co., Inc., Mineola, N. Y., fills need between small Half-A's, big-engine jobs. Shaped, two-piece fuselage, flapped wing, formed gear, wheels, hardware. Scale canopy.

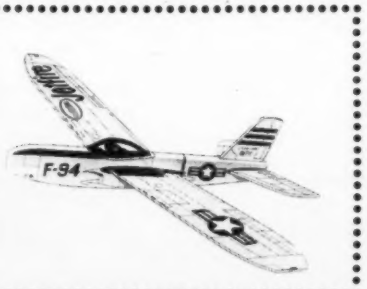
▸ *Stinger:* Realism, sturdy construction, highly detailed step-by-step plan distinguish this Vee-tailed, apple-cheek cowled stunt job designed by Dale Kirn, for F & B

Model Aircraft, Denver, Colo. A plastic bubble canopy, team racing type landing gear, wheels, and an impressive stack of pre-cut balsa parts. Wingspan is 47 in., wing area 480 sq. in., total length 33 in.

▸ *Mighty Mo:* Scale model of famous battleship is first of an entire fleet of American ships planned by Revell, Inc., Venice, Calif. In pacific gray plastic requiring no painting, the ship includes such details as anti-aircraft guns, anchors, miniature ladder, life raft. Model battlewagon is 20 in. long, 2 in beam. All guns may be depressed or elevated during assembly.

▸ *Bobcat* and *Wildcat:* Both these stunt model kits were assembled and flown. Prefabrication is thorough, assembly is easy. Construction is very light, holding down wing loading. Is maneuverable. Designed by Hi Johnson, Kenhi Model Products, Burbank, the Bobcat is a 37 in. stunt trainer; the Wildcat, a full stunt, flapped job of same span. For .14 to .35 engines.

▸ *Jet Fire Glider:* A colored plastic canopy is featured in this dime glider by Guillow's, Wakefield, Mass. Span is 12 in., wings have camber and dihedral. Model is colored bright red and blue with markings just like the real thing. Loops, dives, stunts when hand thrown. All fun, good for small fry.



▸ *Waco Cabin:* Scientific Model Airplane Co., Newark, N. J., calls this Half-A controlline scale model their bargain of the year. Has a carved fuselage and formed metal cowling. Designed and built for popular small engines, the Waco features the Jim Walker control system, is easy bipe.

▸ *Curtiss Hawk:* A memorable model of a memorable army fighter, by Berkeley Model Supplies, West Hempstead, N. Y. In 3/4 in. scale, this P-6E is for .09 to .15 engines. It's a Don McGovern design and has all the trimmings. Its spectacular color scheme is an authentic rendering of an earlier day.

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Kiwi ABC 61" A-B-C 6.95
Lift Master 34" AA 2.25
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Buried in This Ad
are most of the new items. Sometimes there isn't time or space to list all of them. But, if available anywhere, we have it.

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Privateer Flying Boat 36" FF AA 2.95
Profile Powerhouse 24" AA 1.00
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Baby Era 18" AA-A 2.50
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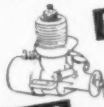

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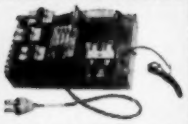

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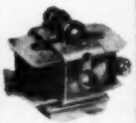

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Man At Work

(*Continued from page 4*)

▸ Speaking of trade matters, there's a new feature, "Trade Show," on page 5. MAN makes a practice of building, or having built, many of the items for testing. Whenever results warrant it, there'll be appropriate comments. Don't have to point out other special articles and plans in this December issue. If better free flights or controlline jobs than Gilliam's Super Civy Boy, and that D-7 scale model exist, will publicly eat the D-7, lines, U-Reely, and all! That Nordic contest report, pages 11, 12, 13, is "must" reading. The U. S. did a job on Wakefield and FAI Gas this year but now the heat is on to stop muffing the Nordic. Incidentally, Bill Dean has done a good service with his excellent reporting of all these international meets.

• • •

▸ Stayed up most of the night for a week straight to get a ship into the air at Selinsgrove. We eastern RC modelers were in a sad state. Like McElwee, who was down to his original Robot. Some had nothing left. Fortunately, Macnabb made our trip a success by showing us what late models of his CR and AR receivers could do. Funny, how guys wonder if that small transmitter has range. That puzzled deBolt at Selinsgrove last year, for his 465 stuff was flown out until it was a speck, somewhere between a mile and mile and a half. We made 12 flights on the CR receiver. So sensitive that you couldn't point the antenna at the ship anywhere nearby. Sent one flight out better than a one-half mile but "four eyes" had to chicken out; with a radar scope we might have found out how far it could have gone. As Lorenz recounts in "Radio Control News," it poured rain most of the time. On Labor Day, Walt Good, Frank Yuhauz, and MAN at Work flew combat on three frequencies. After tumbling about on a full-tank run, you land, then don't remember a thing. It's wild, and it's fun. First time we ever saw Walt remotely excited. This combat stuff is coming but will take special ships. Stunt will take special jobs. DeBolt was flying symmetrical wing stuff with typical ukie stunt proportions. Really short. Pylon racing will take special ships. This stuff is going to split in several directions. Get on those design boards! With 465, enjoyed ourselves, not having to wait out the 27 line. Never thought of that angle before. Reminds us, though, of Macnabb at the Nats. He had both his 465 and 27 receivers in one airplane. Ever try to go through two lines at once?

• • •

▸ The first Wakefield contest with 1954 rules took place on September 20, when the Prop Spinners won the East Coast Challenge Meet over Massachusetts and a Canadian team. Despite windy conditions, high times for three-men teams were: New York—20:10.2; Boston—18:31.3; and Montreal—16:54.5. Individual times were: Renaud (true 1954 design) — 7:49.8; Bill Fletcher — 7:44, and Bob Hatschek—6:18.8. With better than six minutes Bob Quermann didn't bother with unneeded third flight. Montrealers and some Bostonians used 12 strands of quarter inch. Fewer strands with same hook spacing. Boston thought 14 strands a lot, with shorter hook spacing, while New York blasted off with 16, flew as well as before but times averaged, for example, 2:34 for Fletcher, 2:40 for Quermann. There's a three-minute limit. Most of the ships were old-rule models, modified, and loaded down with clay, lead, concrete, gravel, and so on.

• • •

▸ More about Diesels: Ted Martin, noting second reference to "amyl nitrate" in his recent article, "Know Your Diesels," should have read "amyl nitrite," has this sequel to the ether investigation mentioned a couple of months ago in MAN at Work. "There are dozens of different ethers," says Ted, "but unfortunately many of them are not of use to us. Too much acid, recognized by a cloudiness when mixed with oil. Drug stores around here (Toronto) stock, among others, Ether USPX Merck, which is ethyl oxide u.s.p. $(C_2H_5)_2°$. Specific gravity .720, mol. weight, 74.12. It works very well and there is no need to look further. The usual aura of spurious mystery is being cast upon Diesel fuels, and the lads will all be breathing about secret ingredients, and trying every new radioactive popskull. The same thing obtained in the very early days of racing engines. We went through the fuel labor pains several years ago in England and we eventually found the answers. They are in that Diesel article, the ones worth knowing."

• • •

▸ California had the worst earthquake in history with the threatened loss of the Sepulveda Basin flying site. Bulletins and news flashes came in ticker tape fashion. This situation puts Los Angeles in the same spot New York—and many other cities—have been on since the end of the war. Controlline boys are losing areas, too, but for other special reasons. Many free flight sites are giving way to new housing but other good ones are lost simply because the models have almost unlimited and unknown duration under average flying conditions and their builders assume that a straight line is the shortest distance between two points, take-off and landing, and have little regard for the obstacles in between. Offsetting these dismal tidings are frequent reports of municipal cooperation in some localities.

H. G. Oliver, Beaumont, Tex., brags about the "finest controlline flying field in the South." And maybe it is. "Just picture the top of a billiard table scale up to permit four flying circles," Oliver says. "Three of them are grass with concrete centers and one is completely concrete. We have floodlights for night flying, drinking fountain, outlets for soldering irons, and the complete area is fenced in with steel pipes set in concrete and strung with cable."

It seems to us that the Model Industry Association has a job here that would endear it to its customers. Why does one city cooperate, while others frown on the activity? Some towns provide circles, others pass laws against flying models within town limits.

• • •

▸ Been corresponding with Grover W. Moore of Corona Del Mar, Calif., ever since we saw a scale Typhoon free flight of his a couple of Nationals ago. Goes in for low wings, high loadings, and zippy performance. Never tell what you can learn from things like this. Grover, it seems, is perfecting the perfect retriever. Four legged chap, Von by name, who has two semesters and a post-grad course under his belt (if he should wear one!) at the Orange Coast College Dog Obedience Class. He is taught to find planes, but not to pick them up. This could be important where a multi-control RC might be concerned. Von sits by the ship and speaks (barks to you) to indicate the whereabouts of the missing craft. Moore puts oil of anise on the models as an aid to scenting making sure that the 85 pound Von, a German shepherd, can sniff out the plane when it hides away in tall grass. Von's pop, incidentally, was brought over from Heil Hitler's kennels by a G.I. It is reported Von won't find any Messerschmitts.

• • •

▸ Ending on a glad note, congratulations to Charlie Penn and his Railroad Model Craftsman magazine, on the publication's twentieth anniversay. Many more happy birthdays to the RMC, Charlie!

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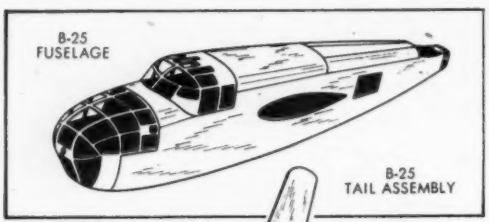

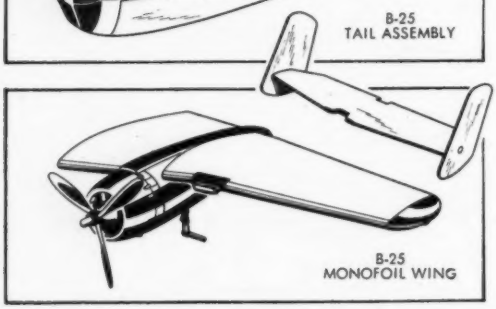

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Line-up of World Glider Champions. L to R: Bernfest, Yugoslavia, '50; Czepa, Austria, '51; Hansen, Denmark, '53; and Gunic, Yugoslavia, '52.

The glider shown is Hans Hansen's winner of the Swedish Cup, or the Nordic event, as it is better known. Plans will appear in future issue.

Yugoslavia's Bora Gunic, one of the world's greatest towline men. Long fuselage job placed fourth this year; the spare airplane first in 1952.

Genial George Perryman, who brought good ship and southern accent to Bled, was on spot through U.S. international wins. But he got bad breaks.

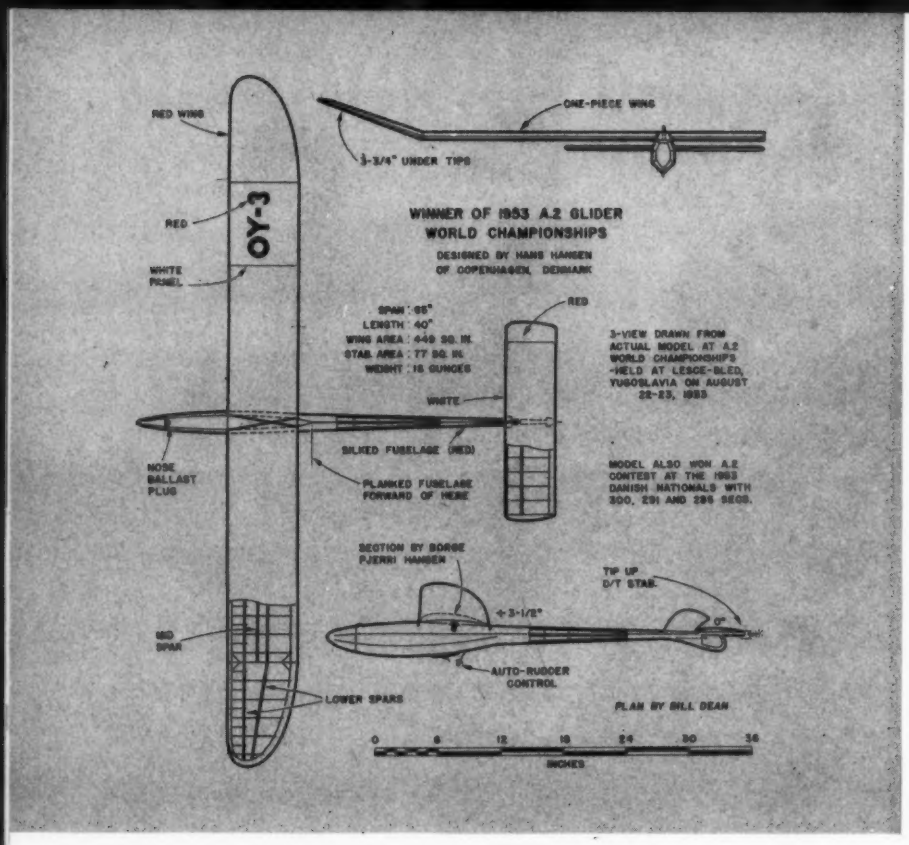
WORLD GLIDER CHAMPIONSHIP

Fourth and final of the 1953 series of World Model Championships, for A-2 Class gliders, won by Denmark; weird and wonderful design.

by BILL DEAN

▶ The fourth and final contest in the 1953 series of World Model Championships for A-2 class gliders* was flown off at Lesce-Bled in Yugoslavia (also the scene of the '51 meeting), against a backdrop of breathtaking Alpine scenery. For the first time since the 1950 inaugural contest, the "Swedish Cup" went to one of the group of Nordic countries (Finland, Norway, Denmark and Sweden) which originally came up with the idea of an International Glider Contest of "Wakefield status," the winner for '53 being 40-year-old Hans Hansen of Copenhagen, a Dane with some 13 years of modeling experience behind him. Standing out in sharp contrast amidst a crop of some of the most weird and wonderful gliders ever seen on any contest field, the winning Danish design was a typical example of the straightforward rugged

**A-2 Specification: 495-526 sq. in. total wing and stab. area; min. fuse. X-section of 5.26 sq. in.; 14.46 oz. min. weight.*



World's top glider, shown in the drawing, left, and picture, below, was the work of Hans Hansen, Copenhagen. Also won the Danish Nationals. Europeans excel in actual glider flying techniques. We can do.

models favored by the Nordic countries. Hansen won with three five-minute flights.

After the memorable free flight power and Wakefield contests held at Cranfield just three weeks earlier, we wondered if the A-2 Championships might not prove to be something of an anti-climax. However, our fears were groundless, since the standard of building and flying was just as high, with more originality in design than was apparent at the Cranfield contests. It's worth recording that this year's meeting attracted a record number of 55 entries (as against 40-odd in '51 and '52) from no less than 16 different countries. Previous A-2 Championships were won by Yugoslavia in '50 (Stephen Bernfest), Austria in '51 (Oskar Czepa) and Yugoslavia again (Bora Gunic) last year.

The '52 meeting at Graz, in Austria, was held in practically still-air conditions, this proving so successful that the Yugoslav organizers decided to follow the same procedure for this year's Championships and commence flying soon after dawn, when calm conditions are most likely and thermals usually at their weakest. The idea was to fly off the first and second rounds on one day and the third round on the following day, each round to last one hour. However, an unforeseen change in weather conditions finally caused an alteration in plans—but more of this later.

This year it seemed that the fates were conspiring to keep the English-speaking countries out of the contest altogether, since all the British models were lost on the train journey across Europe; Dick Everett of the American team failed to turn up; one of the U. S. proxy models was lost in transit and all of the New Zealand proxy entries went astray somewhere between the Belgian port of Ostend and the Yugoslav frontier!

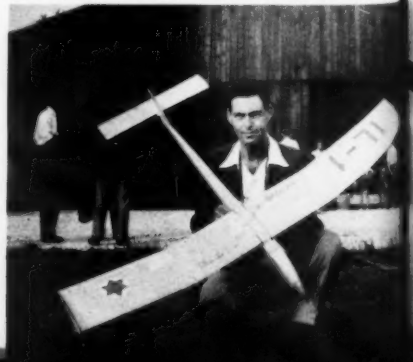
Things got under way on August 21, when all the models were processed and the contest officially opened by the President of the Yugoslav Aero Club. Many of the competitors spent the evening in last minute flight testing—including the American team, which consisted of Bill Fletcher (manager), George Perryman and Ed Smull, the latter flying proxy for Henry Doré. A welcome surprise addition to the U. S. contingent was Chris Zaic, who was vacationing in Europe and naturally had to make the trip to Lesce-Bled when she heard that America was flying in the A-2 Championships for the first time.

Sad to relate, the American contestants did not cover them-

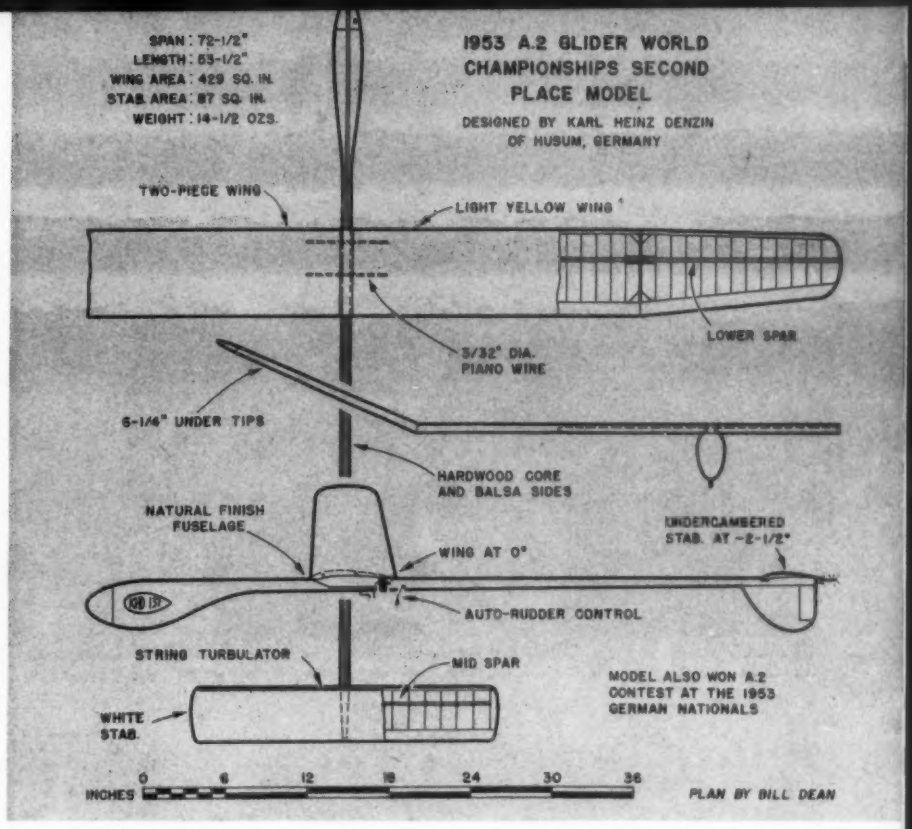
G. Skalla, sixth. Note wing and pod for section.

Elastic turbulators on leading edge, a Switzerland design.

Low aspect ratio, tip plates. N. Kadmon, Israel.



Details of the second place Nordic winner show up in picture, below, and plan, right. Note string turbulator on stab. Germany is placing high in all the international events. Karl Denzin, below, flew in Nordic.


SPAN: 72-1/2"
LENGTH: 53-1/2"
WING AREA: 429 SQ. IN.
STAB. AREA: 87 SQ. IN.
WEIGHT: 14-1/2 OZS.
1953 A.2 GLIDER WORLD CHAMPIONSHIPS SECOND PLACE MODEL
DESIGNED BY KARL HEINZ DENZIN OF HUSUM, GERMANY
TWO-PIECE WING
LIGHT YELLOW WING
LOWER SPAR
3/32" DIA. PIANO WIRE
6-1/4" UNDER TIPS
HARDWOOD CORE AND BALSA SIDES
NATURAL FINISH FUSELAGE
UNDERCAMBERED STAB. AT -2-1/2°
WING AT 0°
AUTO-RUDDER CONTROL
STRING TURBULATOR
MID SPAR
WHITE STAB.
MODEL ALSO WON A.2 CONTEST AT THE 1953 GERMAN NATIONALS
INCHES 0 6 12 18 24 30 36
PLAN BY BILL DEAN

selves with glory as at Cranfield; in fact, the cards were stacked against them right from the start. In the first place, they had only two models, which arrived late on the eve of the contest. The best of these was Perryman's dihedralled stab, Nordik, which was lost in a cornfield just as dusk was falling and was found again only after it had been subjected to 20 hours of rain and sun, which naturally played havoc with the trim. Bill Fletcher was to have flown proxy for Ed Krause, but the latter's model never arrived. Ed Smull did his best with Henry Doré's model, but an hour or so of testing was hardly enough for him to get to know its characteristics.

Determined to fly or bust, the British team burnt up the midnight oil and built a couple of "quickie" replacements in the nine hours prior to the start of the contest, materials being generously supplied by fellow contestants. It was one of those moments that stick with you always, when the British boys climbed wearily into the airfield coach at 3:45 a.m.—with the dope still wet on their models—to a burst of cheering from modelers of all nationalities. Out at the airfield, it was raining slightly, the grass was soaking wet and we had begun to wonder if it might not have been a good idea to have gone to bed for a few hours after all, in spite of the "firing squad" time for the start of the contest!

As the sun climbed over the rim of the mountains, weather conditions began to improve and after a half-hour postponement of the scheduled start, the first round kicked off at 5:00 a.m. First to fly was Karl Heinz Denzin of Germany, who recorded a near maximum of 4:45. There was practically no wind and surprisingly quite strong lift about, the latter soon giving rise to several five-minute flights. A few potential maximums were clocked off after only two or three minutes, as the timekeepers lost sight of the models in the prevailing haze. There was some drift at towline height, but lack of ground wind meant that models could be towed up in any direction—with the inevitable result of crossed lines and frayed tempers.

At 5:30 a.m. the sky suddenly clouded over, a chill wind sprang up and it started to rain heavily. No shelter had been provided at the control point—which was a five-minute walk from the airfield buildings—and in a matter of minutes, most contestants and their models were saturated. In spite of the almost impossible conditions, (*Continued on page* 38)

The best built job, M. Hacklinger, Germany, twelfth.

J. Templier, France, third. Wire braced and plug-in panels.

5-side fuselage, two panels. Bausch, Dutch, fifth.

the Fokker D-7

by DICK ENOS and SHORTY WRIGHT

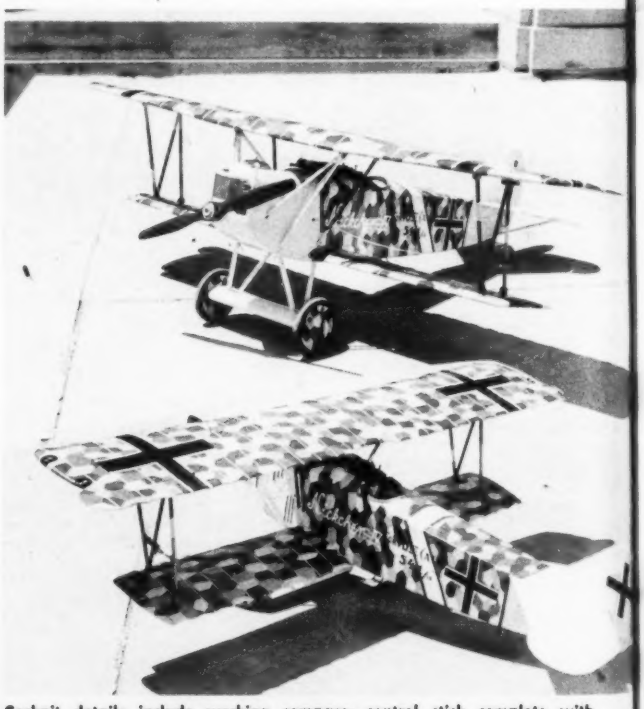
"We actually lived out these models, and felt the excitement that the fliers of the originals must have felt when airborne in their D-7's," say Dick Enos and Shorty Wright of the twin masterpieces.

We decided to build the Fokkers after seeing Joseph Nieto's drawings in the 1951 August and September issues of MAN, using a scale of 1-1/4 in. to the foot. The only prefabricated parts are the compasses, engines and propellers. Both models are covered with silk with all lettering and details hand painted. The wingspan is 37-1/4 in. Both were successfully flown with an Atwood Champ .60 engine.

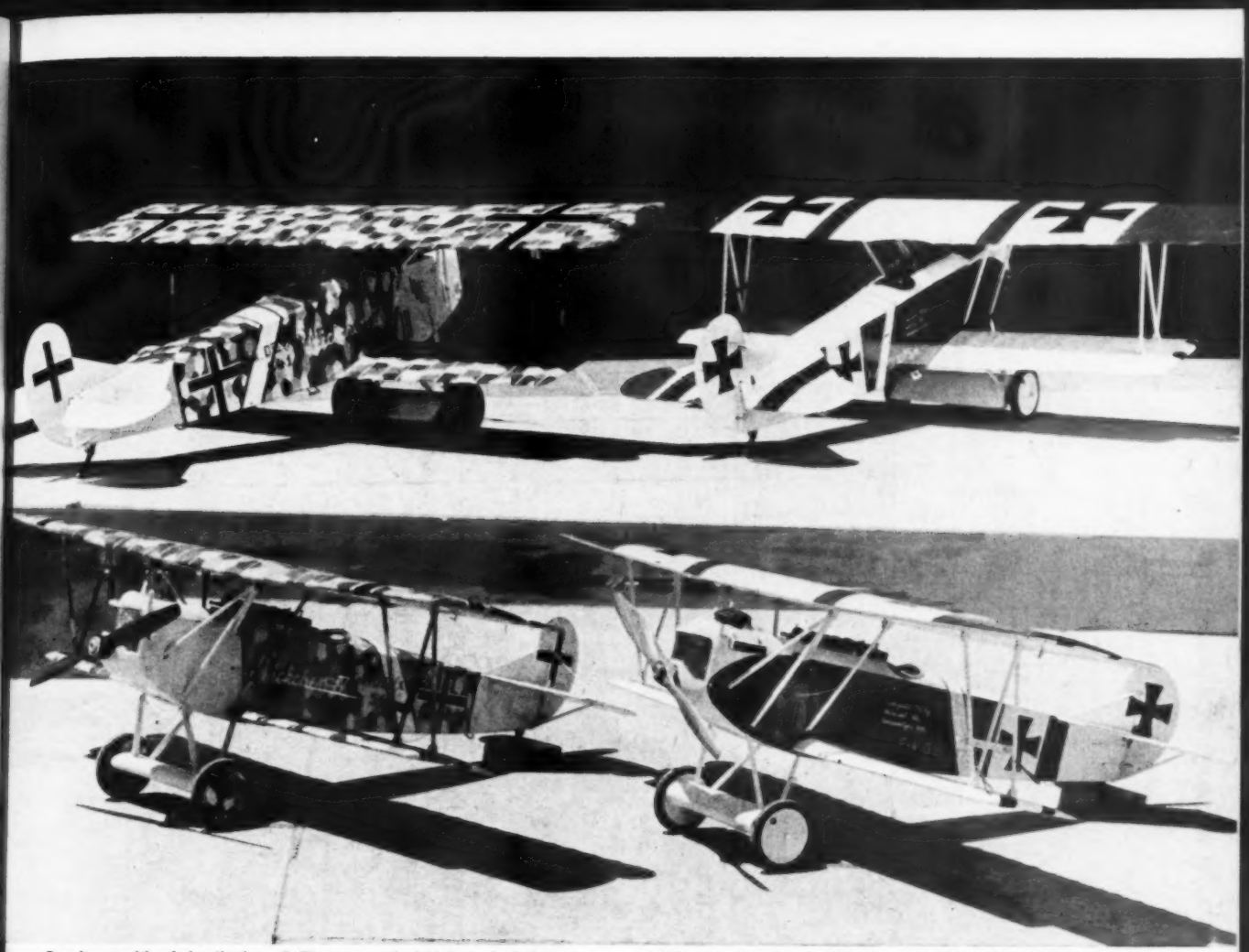
The fuselage is built up with 1/4 in. sq. medium hard balsa. The forward section of the fuselage is laminated, a core of 1/8 medium sheet balsa and 1/16 sheet plywood sides. This forms the front curve to the bottom of the fuselage where the lower wing recesses, then tapers along the lower longeron. The lamination is made before this section is cut. By this construction we found scale lines could be followed with maximum strength needed in this area. When both laminations are completed, the upper and lower longerons are spliced into position, cemented and clamped until dry. These sections are placed over the drawings and both fuselage sides then built.

When the fuselage sides are built, locate the motor mounts

Both D-7's are precise scale, including the paint schemes. Machine guns, visible in rear view, are built up of sheet brass and wood; are removable.



Cockpit details include working compass; control stick complete with auxiliary throttle; machine gun trigger; throttle and spark controls; pedals.



Despite wealth of detail, these D-7's are practical U-Control airplanes. Wings disassemble by means of fittings, nuts and bolts. Except for the slightly protruding heads of the Atwood .60's—other .60's may be used—and the lead-outs for line attachment, ships would pass for real thing.

inside to suit the engine to be used. The rear sections of the fuselage sides are brought together, cemented and clamped and the remaining cross braces put in.

Locate and secure No. 1 and 2 bulkheads. The No. 2 bulkhead locates the gas tank and the front landing gear strut. No. 3 bulkhead is then made and cemented into position. This bulkhead locates the rear landing gear struts and the bellcrank foundation. The platform is made of 3/32 plywood. The bellcrank is now located and the elevator control wires installed according to the drawings.

The stabilizer is built from the drawings and cemented securely to the fuselage. It will be necessary to cut away a small section of the upper rear corner of fuselage for elevator control horn travel. The elevator is then built with the elevator horn and the scale horns attached before it is hinged to the stabilizer. The rudder fin is built and cemented securely to the stabilizer. The rudder post runs down the rear section of the fuselage. Notch the post wherever necessary for elevator control horn clearance. Build the rudder and attach rudder horns, then hinge to the fin the same as elevator. Fabric hinges are used. Now it is necessary to build the cockpit and all cockpit details so that all control cables can be connected before covering.

The floorboard is made of 1/16 plywood. The control stick is of dowling and sanded to shape. The pivot section of the control stick is made of brass tubing. The tubing on the control stick has an elongated hole drilled to give forward and backward motion. The pivot bar passes through this hole by a small hole drilled horizontally through both and a pin secured through it. This pivot bar, made of 1/16 in. brass tubing, is anchored at each end with short pieces of tubing soldered to brass plates and anchored to the floorboard. This acts as the bearings. At the front end of the pivot bar the rudder pedals are located.

An upright shaft is soldered to a short piece of brass tubing through which the pivot bar passes. This tubing also has a plate soldered to it and anchored to the floorboard. The rudder bar is built to swivel on this shaft and is made of 1/16 steel wire. Two loops are formed for the toe rest and are soldered on the rudder bar. A small eyelet is mounted on the inside of each loop. The rudder control cables pass through these and are secured by wrapping and soldering. The heel plates are then installed.

Two eyelets are placed on the control stick for elevator control cables. Control stick accessories are built up of scrap balsa and *(Continued on page 40)*

These magnificent miniature Fokker D-7's perform as well as they look. In 1-1/4 inch scale, they are the absolute top in realistic flying enjoyment. Completely detailed drawings appear on the following two pages.

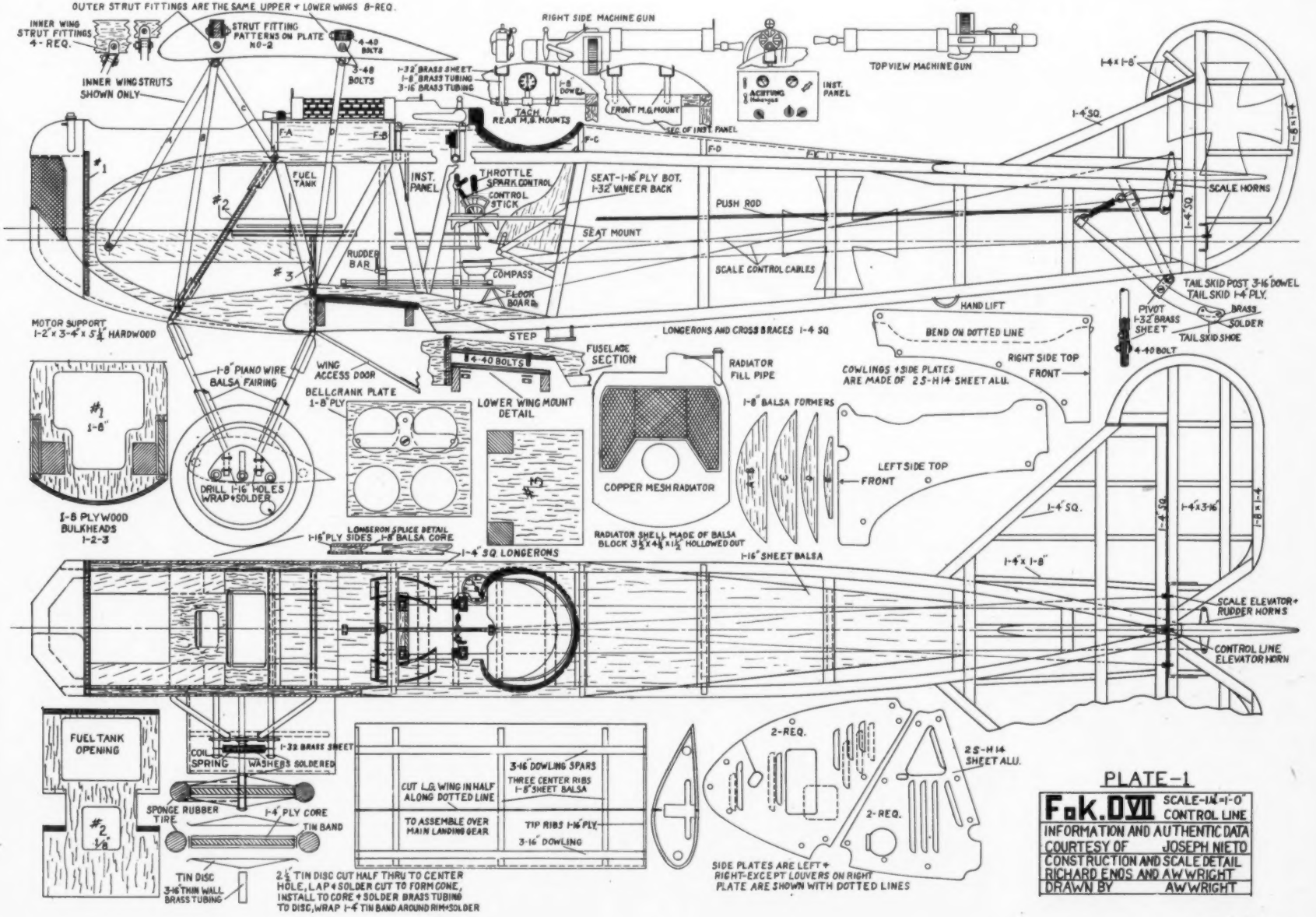


PLATE-1

Fok. D VII	SCALE-1" = 1'-0" CONTROL LINE
INFORMATION AND AUTHENTIC DATA COURTESY OF	JOSEPH NIETO
CONSTRUCTION AND SCALE DETAIL	RICHARD ENOS AND A.W. WRIGHT
DRAWN BY	A.W. WRIGHT

FULL SIZE PLANS FOR "FOKKER D-7" AVAILABLE. SEE PAGE 50.

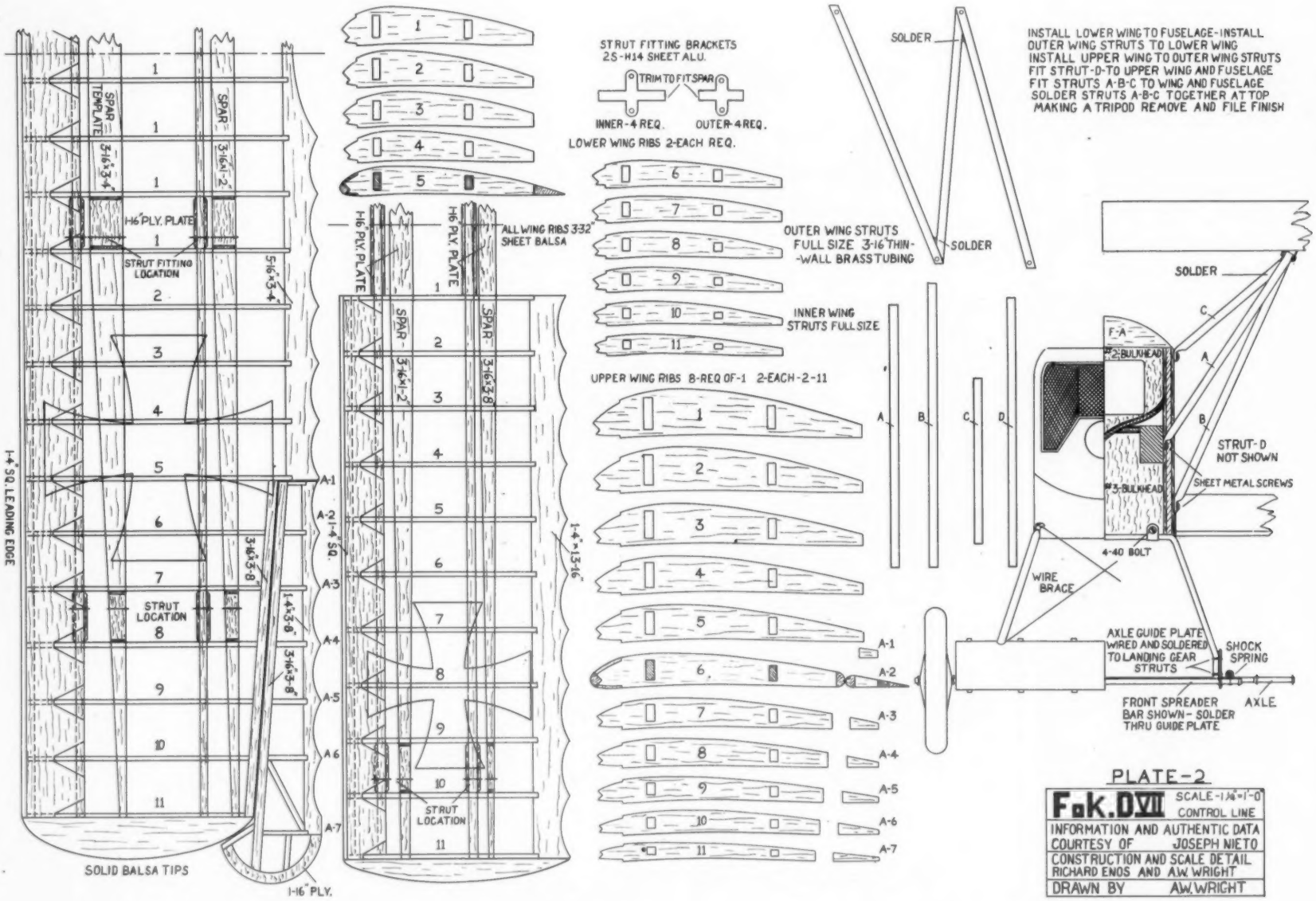


PLATE-2

Fok.D.VII	SCALE-1/4"=1'-0" CONTROL LINE
INFORMATION AND AUTHENTIC DATA COURTESY OF	JOSEPH NIETO
CONSTRUCTION AND SCALE DETAIL RICHARD ENOS AND	A.W. WRIGHT
DRAWN BY	A.W. WRIGHT

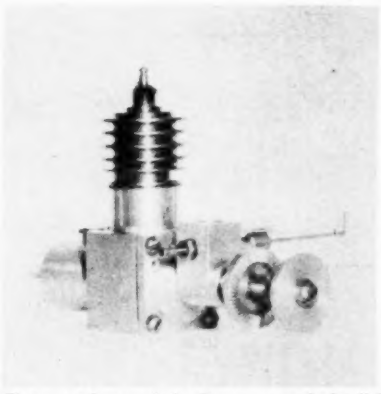
FULL SIZE PLANS FOR "FOKKER D-7" AVAILABLE. SEE PAGE 50.

AIR WAYS

Latest sampling of reader planes really depleted the midnight oil.

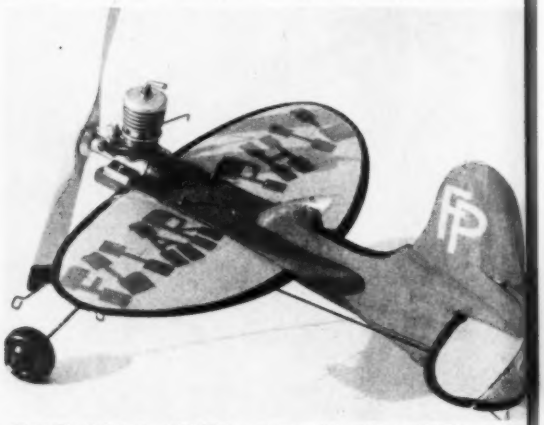
Not a jet taxi but a half-size model of the British Canberra bomber, made for the Paris Air Show. Assembled from planks, plywood, and synthetic glues, it is darn near as big as a Spitfire fighter.

Students of Bel Air High School, Maryland, made many engines from MAN plans. Shown, L to R, are Samme Spicer, Willie Horton, James Sauers. In all, 11 engines made. Photo, Robert Adams.

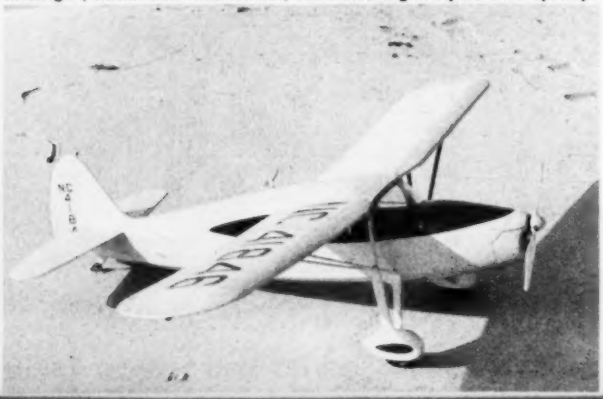


Close-up of one of the Dragons, made by Bel Air students; John Walker, shop instructor.

Work horse of the Navy, better known as PBY, Catalina, or Cat, fascinated L. W. Hess, Salt Lake City, who built 54 in. job. Wylam plans. Torp .19's, 5-1/2 pounds weight.



Eke! The Minimite, 7-1/2 in., 3 oz., ukie, .46 cc. ED Diesel power, ekes along on 20 ft. lines. Ray Malmsirom, Eng.



Fairchild Rancher, from Berkeley kit, by Stan Dutz, Port City Buzzards, Muskegon, Mich. Club flies combat, radio free flight. Hydro sites aplenty.

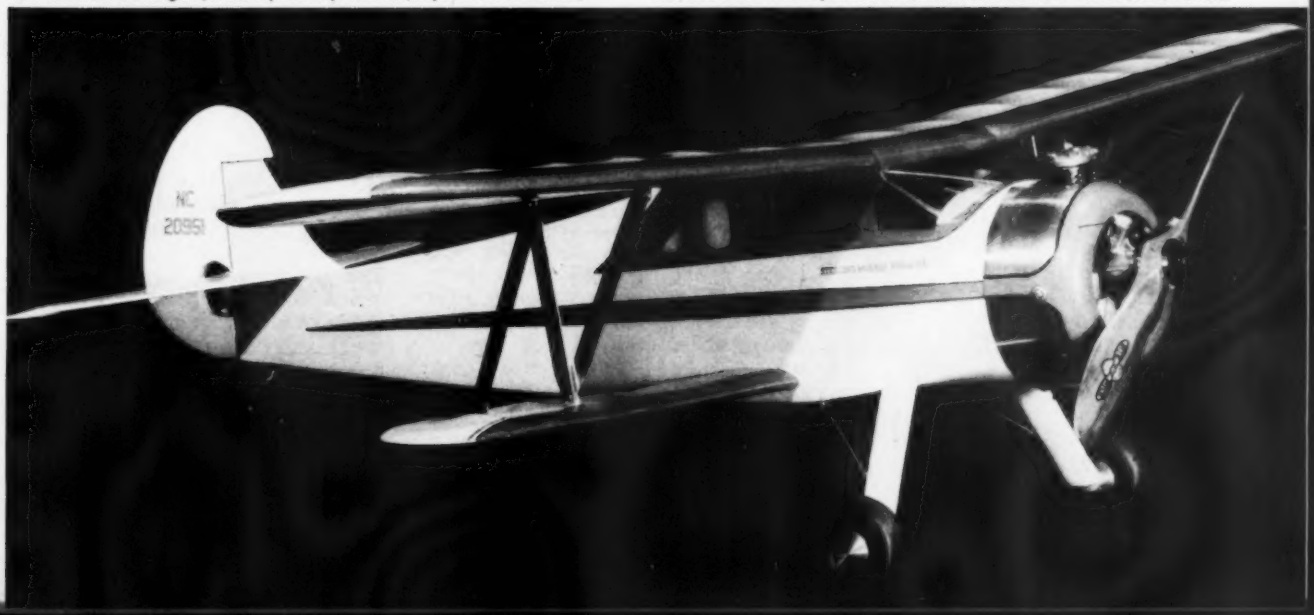
Semi-scale Nieuport 17 (such modesty!), Ed Ferarris, Palisades Park, N. J. Fox. Shot by Gerard Augustine. Both members Father and Sons Model Club.

Dart-powered sport by well known Britisher, Cyril Shaw. Flies well despite small dihedral, scale features. Girl friend Heather appears pleased.

Ken Willard's Drake, published in MAN, an international favorite. This 6 oz., Elfin .49 cc. version by George Sharp, in England, performs well.

Down boy! Eager looking free flight, novel Half-A design, Joe Puccio, Brooklyn Skyscrapers, has hardwood tail boom, inverted Royal Spitfire engine. Gull wing and trike gear distinguish the 44 in. sport job. Judging by side-by-side dummy pilots, it is even equipped for dual instruction.

Many good flights on its K & B .19 engine have proved this Waco, assembled from Sterling kit, to be top notch performer, says L. V. MacDonald, Ottawa, Ontario. Brockville Model Airplane Club hot on U-Control, sez he. Cabin Waco is a perennial favorite for its lack of center section struts.



The original exponent of the long tail moment arm, Gilliam now favors an ultra short-nose moment as well. Experiments prove increased ability to handle power, with improved transition to glide.

SUPER CIVY BOY 61

The name is the same but the ship boasts many innovations that don't immediately meet eye.

by PAUL GILLIAM

Nose construction permits quick and easy adjustments for thrust. B & B timer tank was used.

The trend in free flight model design in the last two years has been toward the large area model or 800 sq. in. for Class B jobs. However, you will note that the Super Civy Boy 61 is only 575 sq. in. This model has had the peak power treatment of the best .29 and .32 displacement engines. It handles well (climb to the right, glide left) under power and has the lowest sinking glide of any Civy Boy to date. This 1953-54 design glides with normal trim at approximately 11 mph, which is 3 mph faster than the older Civy Boys. However, the speed of the glide means nothing; sinking speed is what we are most concerned about. You will still get the same four to six minutes in dead air (depending on power plant).

You will notice a radical change in the airfoil on the Super 61 as compared with the older Civys. This airfoil is an original, but its basic shape is not unknown to modelers. It is this airfoil that gives this new Civy a faster climb under power, and a faster glide too, but a very flat soaring glide. More important, this airfoil really gives quick recovery in transition from power-on to glide. Here is the best way we can conservatively rate the performance of this 1953 Civy Boy compared with best former versions:

1. Climb—10 per cent faster; 2. Glide—same—perhaps 2-3 per cent better; 3. Transition (power to glide)—65 per cent better; 4. Power-on ability—30 per cent better.

Note building time is reduced 25 per cent.

It is readily noted that this 1953 Civy Boy has a very short nose moment. The propeller will just barely clear the leading edge of the pylon and wing. It can be shown that a short nose moment on a free flight gas design gives the model inherent ability to handle peak power.

After the conclusion of many test experiments with the mass moment of inertia, I am fully convinced that mass moment of inertia or longitudinal distribution of fuselage weight greatly affects a model's ability to handle high power and make a quick flat recovery in the transition period from power to glide trim.

Seven years ago I mounted the soap box, campaigning for the use of a long tail moment arm. It is very likely that most of us have more or less proved that our long tail moment arm is here to stay. Now your writer is on the soap box again, this time speaking out for a short nose moment to be used with the long tail moment.

We must accept a compromise for nose moment and tail moment ratios, considering the physical weight and balance problem of our glow engine powered models. It is probably best to let our experiments and theories with the mass moment of inertia rest at this point to get back to this new Civy Boy. The full story of mass moments of inertia will be covered in a separate article in this magazine. These experiments with the mass moment of inertia deal with the dynamic forces affecting model stability, rather than the basic static forces, which most modelers have already mastered.

You will notice that the new Civy Boy 61 has been somewhat simplified for faster construction. More important, this ship is stronger. The fuselage and

The results, however, speak for themselves. Faster climb, better control, longer glide: the pay-off.

pylon will take many hard drops from telephone wires. Rather than give a fully written description on how to build this new ship, I have tried to give you a complete set of drawings. It is reasonable to assume that any modeler who sets out to build a hot contest design can also read the plans easily. Therefore, written step-by-step instructions can only waste the reader's time. So here are the important tips for building and flying this ship.

The fuselage has sheet balsa sides with all longerons and beef-up material outside these sides. Look over this construction closely before you frown, because it has merit for strength, and no cracker box appearance. It is every bit as easy to build as the normal outside sheet side box fuselage type.

The wing platform on the pylon has 4° incidence; the stabilizer platform has 2-1/2° built in, which gives this model an over-all decalage of 1-1/2°. You will find that this model is safe, with an error allowance of 1/2° either way of the given 1-1/2°.

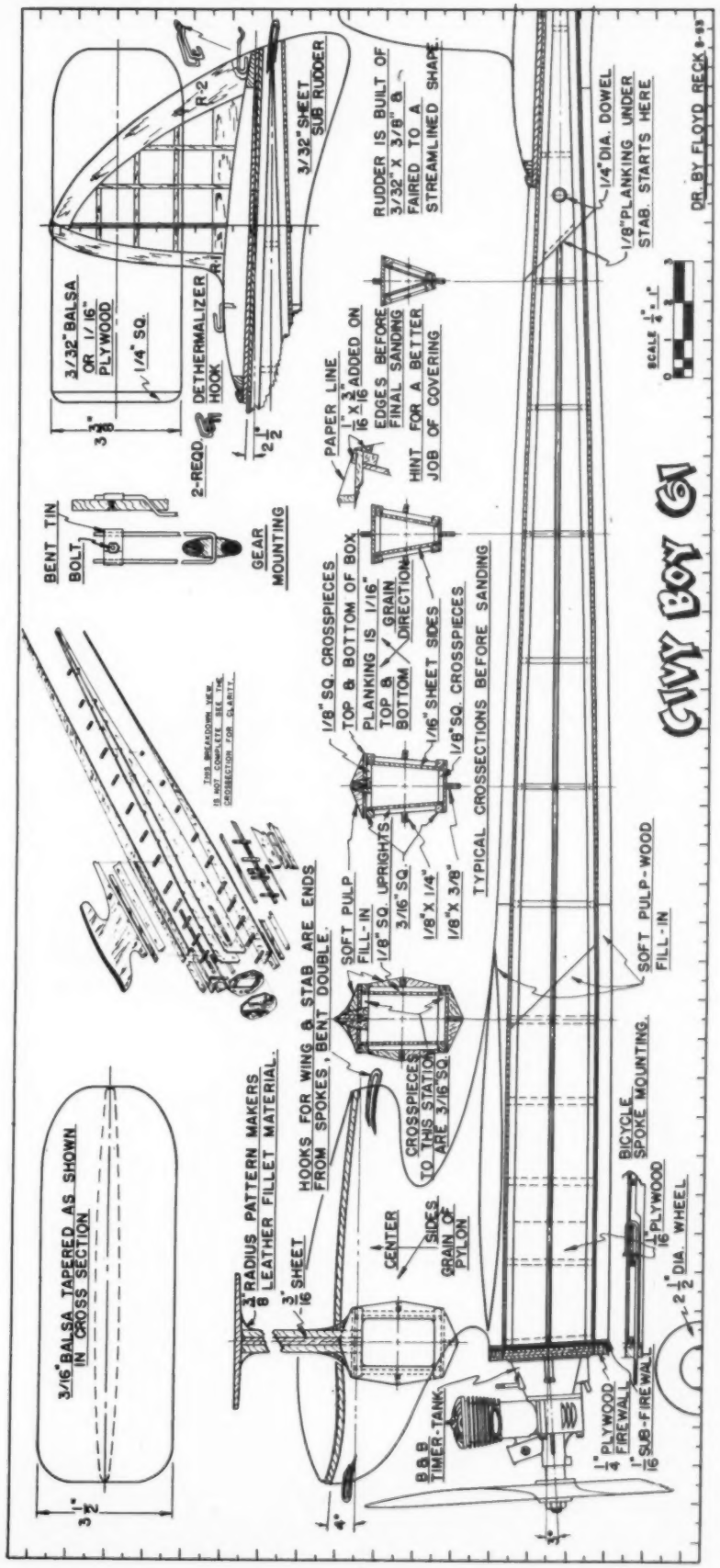
The bicycle spoke and nipple arrangement to hold firewall to fuselage makes a neat rugged forward fuselage, and it is extremely flexible for quick field adjustments of engine thrust. However, many modelers are convinced that the only good way to hold a firewall to a fuselage is by using cement and gauze. The builder may choose his own method.

Note that a B & B timer tank is used as engine mount, tank, and fuel shut-off. I have always had excellent consistent engine runs by using this fuel shut-off system. Too, there must be a number of modelers who possibly feel the opposite. If you are precise when plugging the shut-off tank for desired engine run, accurate engine runs can be had within one second's accuracy. If you have never experimented with this fuel shut-off system, give it a try now, and you will save your model from a nightmare of plumbing with long fuel lines full of air-bells.

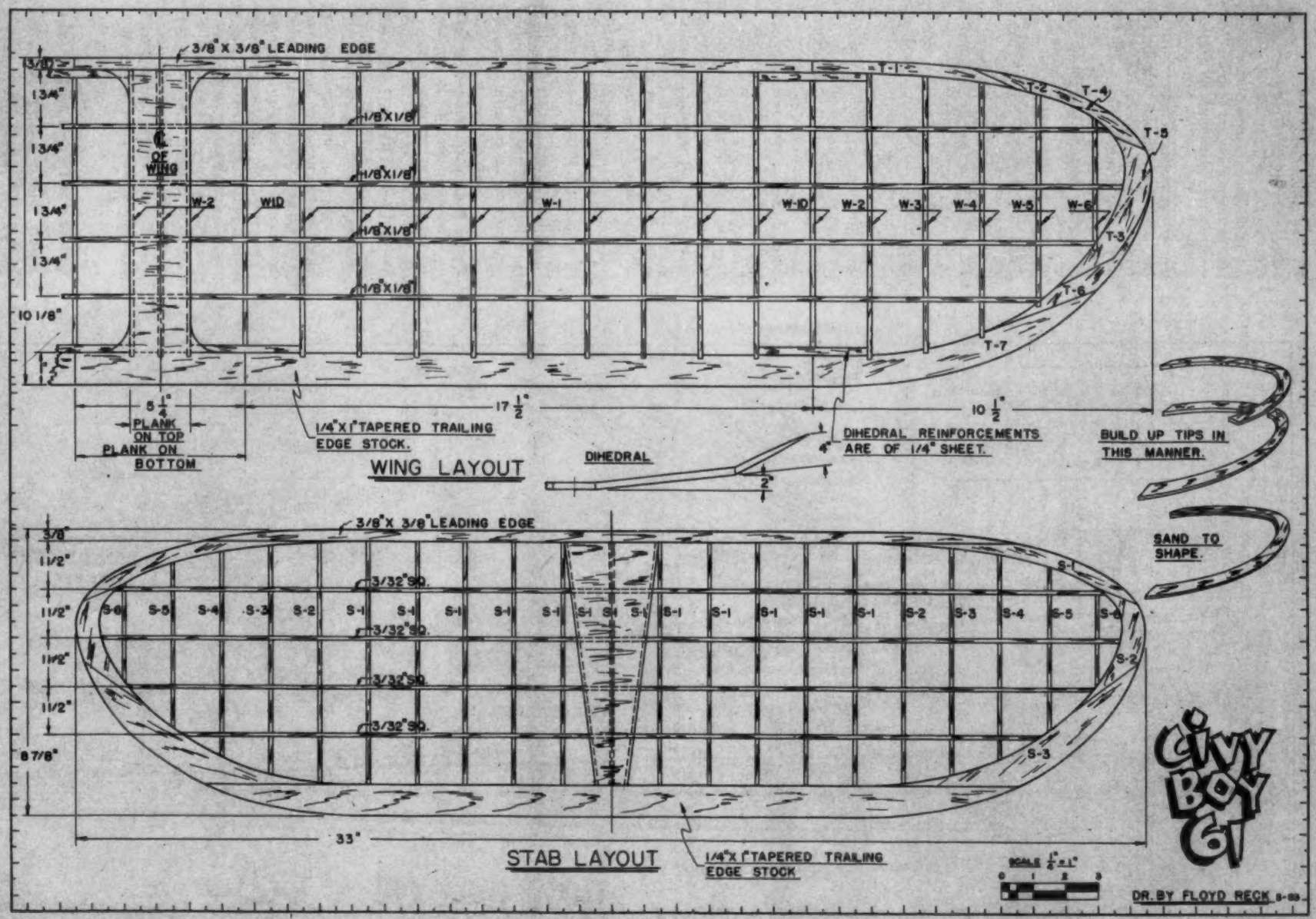
The wing and stabilizer are easy to scale up to full size. Note that the spars and ribs form equal square spaces. This rib and spar spacing lends to a good, strong evenly stressed wing and stabilizer that are nevertheless flexible and non-brittle.

The use of multi-spar construction is frankly a lark. I am not convinced that multi-spar is the best construction for a Class B-C size wing. However, it is probably as good as most. Let us leave it up to

(*Continued on page 32*)


GUY BOY 61
BY FLOYD RECK
3/32" BALSA OR 1/16" PLYWOOD
1/4" SQ.
DETHERMALIZER HOOK
2-REQD
3/32" SHEET SUB RUDDER
RUDDER IS BUILT OF 3/32" X 3/8" & FAIRED TO A STREAMLINED SHAPE
1/4" DIA. DOWEL
1/8" PLANKING UNDER STAB. STARTS HERE
PAPER LINE 1/16" X 3/16" ADDED ON EDGES BEFORE FINAL SANDING
HINT FOR A BETTER JOB OF COVERING
BENT TIN
BOLT
GEAR MOUNTING
1/8" SQ. CROSSPIECES TOP & BOTTOM OF BOX
PLANKING IS 1/16" GRAIN DIRECTION TOP & BOTTOM
1/16" SHEET SIDES
1/8" SQ. CROSSPIECES BEFORE SANDING
TYPICAL CROSSECTIONS
SOFT PULP FILL-IN
1/8" SQ. UPRIGHTS
3/16" SQ.
1/8" X 1/4"
1/8" X 3/8"
SOFT PULP-WOOD FILL-IN
HOOKS FOR WING & STAB ARE ENDS FROM SPOKES, BENT DOUBLE.
3/16" BALSA TAPERED AS SHOWN IN CROSS SECTION
3/8" RADIUS PATTERN MAKERS LEATHER FILLET MATERIAL.
3/16" SHEET
CROSSPIECES TO THIS STATION ARE 3/16" SQ.
CENTER
SIDES
GRAIN OF PYLON
BICYCLE SPOKE MOUNTING
1/16" PLYWOOD
2 1/2" DIA. WHEEL
B&B TIMER TANK
1/4" PLYWOOD FIREWALL
1/16" SUB-FIREWALL
SCALE 1" = 1"

WING AND STABILIZER PLAN ON PAGE 22


3/8" X 3/8" LEADING EDGE
3/8
13/4"
13/4"
13/4"
13/4"
10 1/8"
1/8"X1/8"
1/8"X1/8"
1/8"X1/8"
1/8"X1/8"
℄ OF WING
W-2
W-1D
W-1
W-10
W-2
W-3
W-4
W-5
W-6
T-1
T-2
T-4
T-5
T-3
T-6
T-7
5 1/4"
PLANK ON TOP
PLANK ON BOTTOM
17 1/2"
10 1/2"
1/4"X1" TAPERED TRAILING EDGE STOCK.
WING LAYOUT
DIHEDRAL
4"
2"
DIHEDRAL REINFORCEMENTS ARE OF 1/4" SHEET.
BUILD UP TIPS IN THIS MANNER.
SAND TO SHAPE.
3/8"X 3/8" LEADING EDGE
3/8
11/2"
11/2"
11/2"
11/2"
8 7/8"
3/32" SQ.
3/32" SQ.
3/32" SQ.
3/32" SQ.
S-6
S-5
S-4
S-3
S-2
S-1
S-1
S-1
S-1
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S-1
S-1
S-1
S-1
S-1
S-1
S-1
S-2
S-3
S-4
S-5
S-6
S-1
S-2
S-3
33"
STAB LAYOUT
1/4"X1" TAPERED TRAILING EDGE STOCK
SCALE 1" = 1"
0 1 2 3
DR. BY FLOYD RECK 8-53
CIVY BOY 61

Solid mounting of engine afforded by metal speed pan actually provides increased rpm and greater power output. Flimsy mounts dissipate power.

Reduction of vibration also important in RC, for ill effects on relays, escapements. Below—Firm engine mounting also is needed in free flight.

VIBRATION

---thief of power

by E. C. MARTIN

Did you know that few engines can develop their maximum power when installed in lightweight models? But with these tips you can outfox that ole Gremlin Vibration, get peak performance.

▸ One of the basic requirements for most types of model airplane performance is a high power/weight ratio. It is by no means uncommon for a model to weigh less than the engine which powers it, and for the static thrust to be four or five times the total weight of plane and engine—on paper! Actually, it is very unusual for an engine to develop anything like its maximum power in a lightweight model and the reason may be simply attributed to "torsional vibration."

When one considers that a strong man can produce 1/4 bhp for only a few seconds, it is obvious that a 12 oz. structure of balsa and tissue has to be very carefully designed efficiently to mount and absorb the same effort, especially under the conditions of power production prevailing in a model engine.

A fundamental law of motion is that action and reaction are equal and opposite; therefore a model engine producing an average torque of 20 inch/ounces at the crankshaft, is also exerting a similar effort to twist the model in the opposite direction. But the model, having greater inertia and lateral stability than the prop, remains comparatively unaffected, and the prop turns. A good example of torque reaction is the latest type of model helicopter where the engine is mounted on and turns the rotor.

If torque reaction were smooth and uniform it would have very little effect upon engine performance in any weight of structure, but, in practice, torque varies from a positive to a negative value with every engine revolution. On the firing stroke the prop is driven one way and the engine in turn tries to rotate in the opposite direction; but on the compression stroke the prop momentum drives the engine and consequently the twisting action on the mountings is reversed.

If any relative movement occurs between engine and mounting, each of these torque reversals is fractionally prolonged, which obviously must slow the engine to a degree corresponding with the amount of movement. Similarly, if the engine is rigid on its mounting, but the model structure able to flex, the piston strokes will again be damped.

The severity of this effect is controlled by the weight of the parts involved. For example, a heavy engine and mounting might exhibit a tendency (*Continued on page* 32)

The Mulvihill Model Trophy is still in existence today and was awarded in rubber at the Nats.

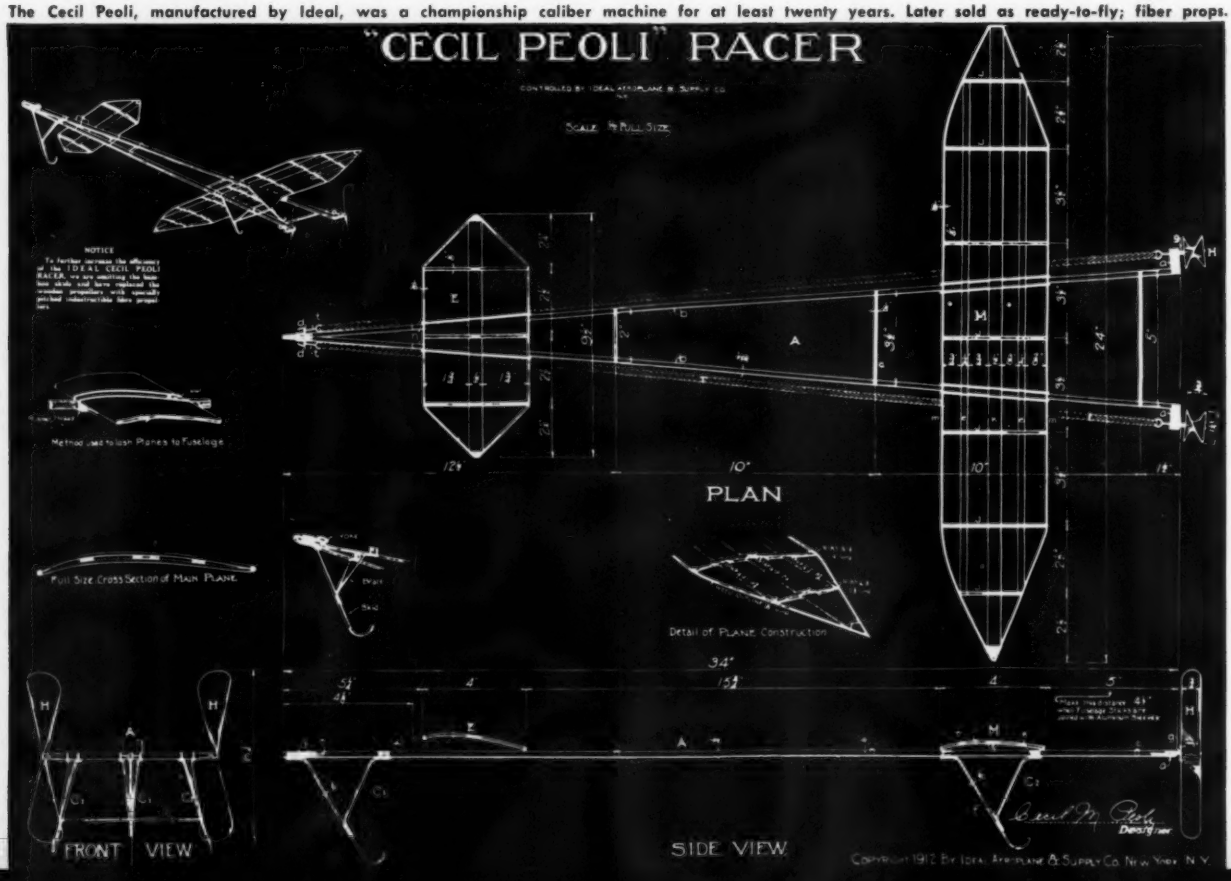
Contestants line up: Paul Oldendorph, near center, holding a Cecil Peoli. Near right are Paul Smith, Bertram Pond, Robert Jaros, Bill Schweitzer, and Ed Lange, who set record of 262.4 seconds.

The FIRST Mulvihill

by CHRISTY MAGRATH

First big break for then relatively small group of modelers was the 1923 Mulvihill Trophy Race, held in connection with the International Air Races at Lambert Field, St. Louis. This eye witness account by an entrant relives the exciting day.

The Cecil Peoli, manufactured by Ideal, was a championship caliber machine for at least twenty years. Later sold as ready-to-fly; fiber props.



Author appears second from left—handkerchief on wing. His model is the Lathrop Tractor, a drawing of which appears at bottom of page. Twin pushers lasted until 1934.

Paul Garber, now Head Curator of the National Air Museum of the Smithsonian Institution, with Sommer's 30-inch twin.

THE International Air Races featuring the famous Pulitzer speed classic were to be held in the fall of 1923 at Lambert Field, St. Louis County, Mo. This time a new event was added to the air races, which had been held in different cities since 1920. This event was the Mulvihill Trophy Race, carrying cash prizes, and was the first big break a relatively small group of flying model enthusiasts had as yet received. Bernard H. Mulvihill was the first vice president of the newly organized National Aeronautic Association, and recognized the value of model flying to aviation. To quote from an article in my copy of the 1923 air race program: "The Mulvihill Model Trophy, donated by the first vice president of the Association, should be a tremendous stimulant to the youth of the country in building model airplanes. The annual competition for its possession should bring out new features in model airplane design which may conceivably have an effect on full scale production. At any rate, it may be assumed that the boys whose interest is thus aroused will contribute much to the progress of aeronautics a few years hence, as designers, mechanics, pilots or users of aircraft, and the drawing of their interest into the aeronautical field early in life presages a longer career of usefulness in this field than would otherwise be possible."

The truth of these words has been realized through the years following 1923. We have no way of knowing exactly how many men and women got started in aeronautical careers through flying models.

The rules of the 1923 race were simple. All models were to be hand launched, rubber powered, and not over 40 in. in their maximum dimension.

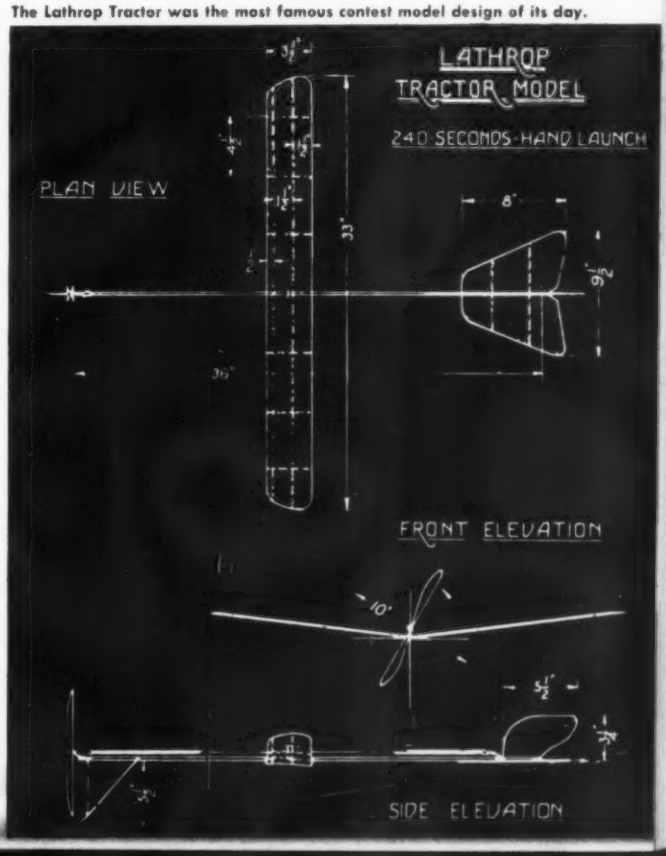
On Sunday, Sept. 30, 1923, a group of young men carrying oddly shaped boxes of flimsy cardboard or light wood, gathered at the Wellston, Mo., street car loop for transfer to a car to the new Lambert Field. A torrential rain from low, dark clouds promised no relief. After waiting around for an hour and a half as more dark nimbuses rolled in from the west, we decided to go home and try again during the coming week. Calling the Air Race Committee, we learned of a postponement of the race to Wednesday, Oct. 3. In fact, the entire air race program had been moved up three days, with the Pulitzer race to be held Saturday instead of Wednesday.

Actually, this was what the "gate" needed. The now extinct "St. Louis Star" newspaper played up the Mulvihill Race for several weeks prior to the event, and published drawings and instructions for two early twin pushers. These were the Rudolph Funk and Wallace Lander models of 1915. The Funk had a wing like the German Taube Monoplane of 1914 and boasted propellers made of twisted birch.

The Lander model had some interesting features also. In contrast to the single surfaced wing of the Funk, the wing was double surfaced with either silk or gold beater's skin and, like its large elevator, had considerable sweepback. The "A" frame had no "cans" and was braced with a king post system of wires resembling the layout on the frame of the 1903 Langley Aerodrome. They used no balsa. These were built by the St. Louis entrants with a couple of Ideal Aeroplane & Supply Company's Peolis.

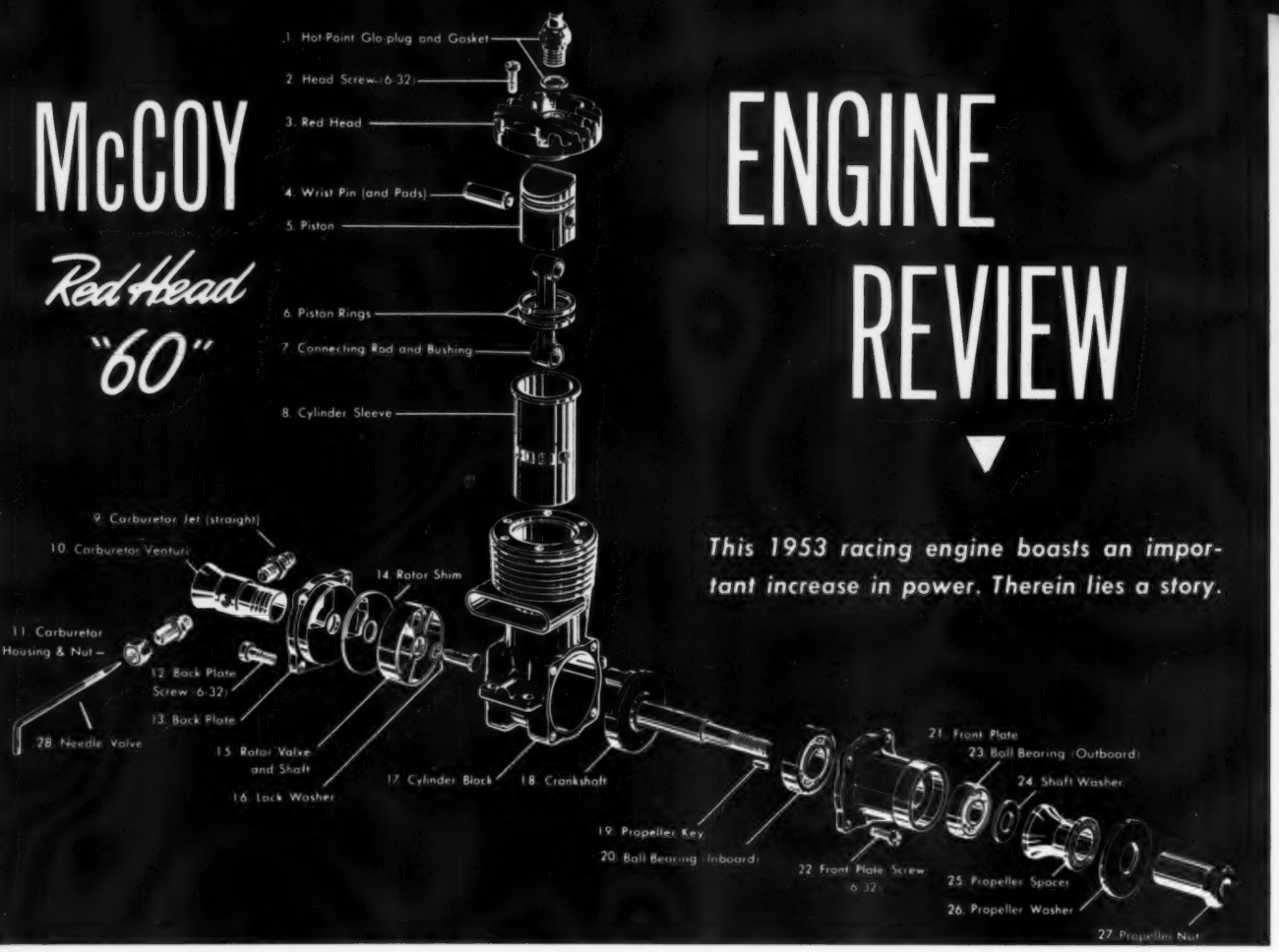
I had been getting the (*Continued on page* 47)

The Lathrop Tractor was the most famous contest model design of its day.

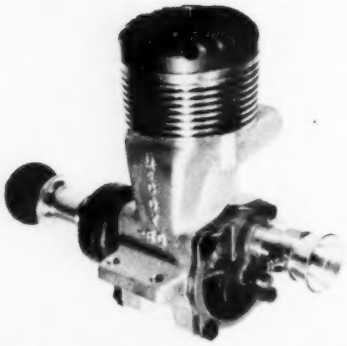


McCOY *Red Head "60"*

ENGINE REVIEW

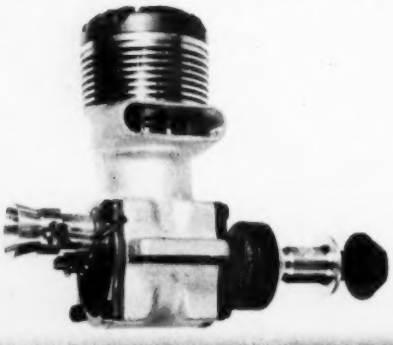


This 1953 racing engine boasts an important increase in power. Therein lies a story.



Rigid, solid construction, plus large, unrestricted porting contributes to performance. Familiar rear venturi shows to advantage in these pix.

Below—Pebbly look to the cylinder block is caused by use of sand casting, which offers greater strength and less liability to fatigue failure.



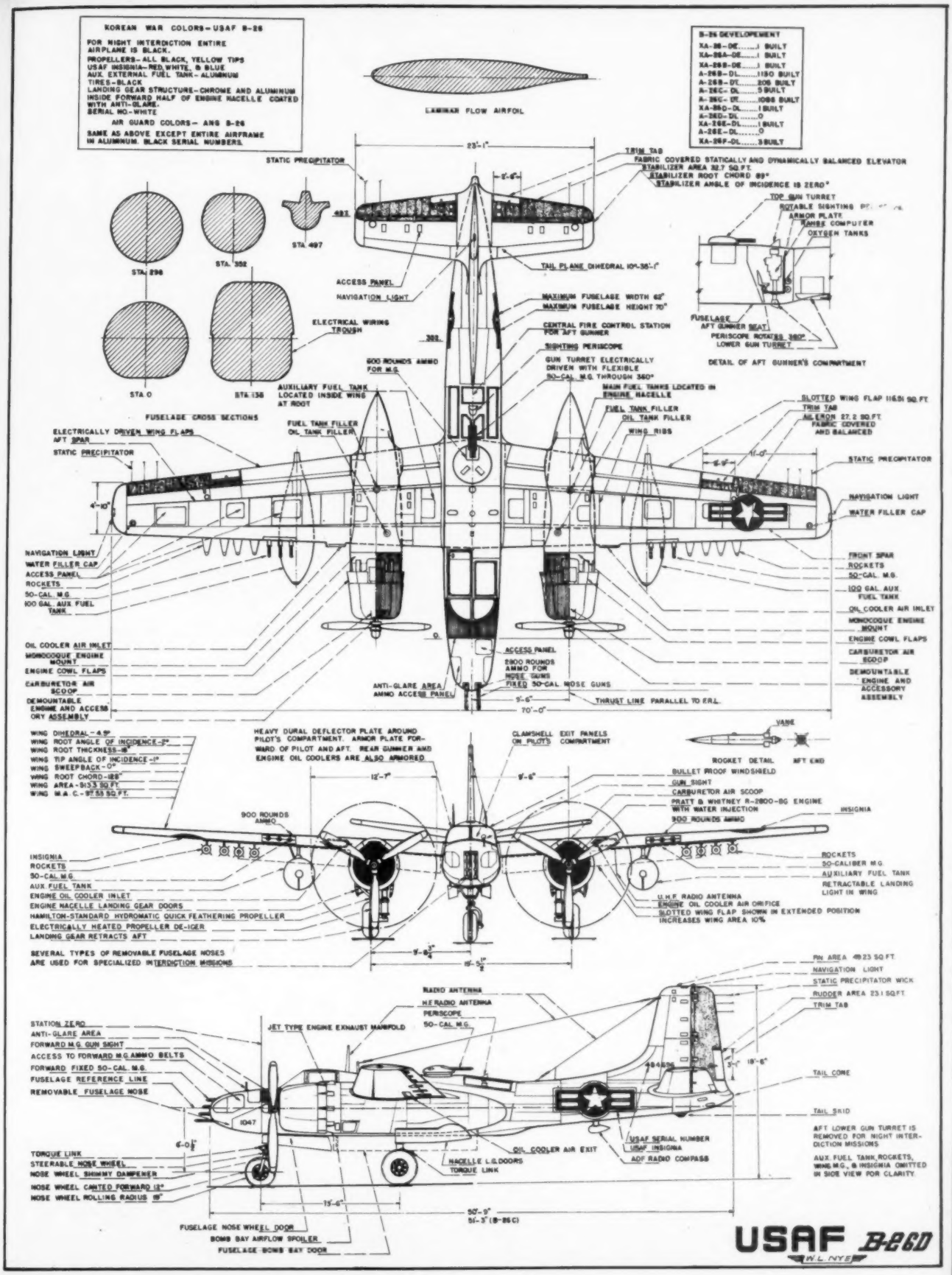
by E. C. MARTIN

▶ The McCoy .60 Redhead is an engine of considerable significance. Apart from its apparently unassailable position in Class D speed, it can also claim to be the most powerful non-supercharged production piston engine in the world, on a power displacement basis. There are indeed very few special full size racing engines that equal the McCoy output of 150 bhp/liter, and none which approaches its power/weight ratio of over 1.5 bhp/pound. It is therefore a great deal more than a toy and must have given many a full size designer pause for thought.

We have owned and operated 12 Macs of all sizes in speed models and team racers from 1947 vintage onward, and never had a bad one. We have reworked some of them beyond recognition and increased output by as much as 60 per cent, and never had one blow up. But perhaps the finest record is that of an old 1947 .29 which took four busy seasons of racing with unfailing reliability and finally won a team race with 1/32 in. play in the rod bearings and the rotor loose and worn saucer shaped. After a ring job, refacing the rotor and rod replacement, that engine is still team racing. It should be added that we have no pull with the factory and have never owned a "special," but nevertheless frequently used Macs in favor of our own Amco designs.

To what can we attribute the Mac performance? Two things are immediately obvious. First is very rigid and heavy construction, and second is large and unrestricted porting. Inside we find enormous gas passages, smooth flow contours, and extensive measures for the reduction of mechanical friction. Boiled down they all serve to provide the essence of engine performance: minimum friction, both gas and mechanical.

(*Continued on page* 50)


KOREAN WAR COLORS—USAF B-26
FOR NIGHT INTERDICTION ENTIRE AIRPLANE IS BLACK.
PROPELLERS—ALL BLACK, YELLOW TIPS
USAF INSIGNIA—RED, WHITE, & BLUE
AUX. EXTERNAL FUEL TANK—ALUMINUM
TIRES—BLACK
LANDING GEAR STRUCTURE—CHROME AND ALUMINUM
INSIDE FORWARD HALF OF ENGINE NACELLE COATED WITH ANTI-GLARE.
SERIAL NO.—WHITE
AIR GUARD COLORS—ANG B-26
SAME AS ABOVE EXCEPT ENTIRE AIRFRAME IN ALUMINUM. BLACK SERIAL NUMBERS.
B-26 DEVELOPEMENT
XA-26-DE.....1 BUILT
XA-26A-DE.....1 BUILT
XA-26B-DE.....1 BUILT
A-26B-DL.....1150 BUILT
A-26B-DT.....206 BUILT
A-26C-DL.....5 BUILT
A-26C-DT.....1086 BUILT
XA-26D-DL.....1 BUILT
A-26D-DL.....0
XA-26E-DL.....1 BUILT
A-26E-DL.....0
XA-26F-DL.....3 BUILT
LAMINAR FLOW AIRFOIL
STATIC PRECIPITATOR
TRIM TAB
FABRIC COVERED STATICALLY AND DYNAMICALLY BALANCED ELEVATOR
STABILIZER AREA 32.7 SQ.FT.
STABILIZER ROOT CHORD 89"
STABILIZER ANGLE OF INCIDENCE IS ZERO°
TOP GUN TURRET
ROTABLE SIGHTING
ARMOR PLATE
BOMBE COMPUTER
OXYGEN TANKS
STA. 296
STA. 352
STA. 407
STA. 0
STA. 138
FUSELAGE CROSS SECTIONS
ACCESS PANEL
NAVIGATION LIGHT
TAIL PLANE DIHEDRAL 10°-35'-1"
MAXIMUM FUSELAGE WIDTH 62"
MAXIMUM FUSELAGE HEIGHT 70"
ELECTRICAL WIRING TROUGH
CENTRAL FIRE CONTROL STATION FOR AFT GUNNER
SIGHTING PERISCOPE
GUN TURRET ELECTRICALLY DRIVEN WITH FLEXIBLE 50-CAL. M.G. THROUGH 360°
600 ROUNDS AMMO FOR M.G.
AUXILIARY FUEL TANK LOCATED INSIDE WING AT ROOT
FUSELAGE AFT GUNNER SEAT
PERISCOPE ROTATES 360°
LOWER GUN TURRET
DETAIL OF AFT GUNNER'S COMPARTMENT
MAIN FUEL TANKS LOCATED IN ENGINE NACELLE
FUEL TANK FILLER
OIL TANK FILLER
WING RIBS
SLOTTED WING FLAP 116.84 SQ.FT.
TRIM TAB
AILERON 27.2 SQ.FT.
FABRIC COVERED AND BALANCED
ELECTRICALLY DRIVEN WING FLAPS
AFT SPAR
STATIC PRECIPITATOR
NAVIGATION LIGHT
WATER FILLER CAP
FRONT SPAR
ROCKETS
50-CAL. M.G.
100 GAL. AUX. FUEL TANK
OIL COOLER AIR INLET
MONOCOQUE ENGINE MOUNT
ENGINE COWL FLAPS
CARBURETOR AIR SCOOP
DEMOUNTABLE ENGINE AND ACCESSORY ASSEMBLY
ACCESS PANEL
2800 ROUNDS AMMO FOR NOSE GUNS
FIXED 50-CAL NOSE GUNS
ANTI-GLARE AREA
AMMO ACCESS PANEL
THRUST LINE PARALLEL TO E.R.L.
WING DIHEDRAL - 4.9°
WING ROOT ANGLE OF INCIDENCE - 2°
WING ROOT THICKNESS - 18"
WING TIP ANGLE OF INCIDENCE - 1°
WING SWEEPBACK - 0°
WING ROOT CHORD - 128"
WING AREA - 513.3 SQ.FT.
WING M.A.C. - 97.55 SQ.FT.
HEAVY DURAL DEFLECTOR PLATE AROUND PILOT'S COMPARTMENT. ARMOR PLATE FORWARD OF PILOT AND AFT. REAR GUNNER AND ENGINE OIL COOLERS ARE ALSO ARMORED
CLAMSHELL EXIT PANELS ON PILOT'S COMPARTMENT
VANE
ROCKET DETAIL AFT END
BULLET PROOF WINDSHIELD
GUN SIGHT
CARBURETOR AIR SCOOP
PRATT & WHITNEY R-2800-BG ENGINE WITH WATER INJECTION
900 ROUNDS AMMO
INSIGNIA
ROCKETS
50-CALIBER M.G.
AUXILIARY FUEL TANK
RETRACTABLE LANDING LIGHT IN WING
U.H.F. RADIO ANTENNA
ENGINE OIL COOLER AIR ORIFICE
SLOTTED WING FLAP SHOWN IN EXTENDED POSITION INCREASES WING AREA 10%
INSIGNIA
ROCKETS
50-CAL M.G.
AUX. FUEL TANK
ENGINE OIL COOLER INLET
ENGINE NACELLE LANDING GEAR DOORS
HAMILTON-STANDARD HYDROMATIC QUICK FEATHERING PROPELLER
ELECTRICALLY HEATED PROPELLER DE-ICER
LANDING GEAR RETRACTS AFT
SEVERAL TYPES OF REMOVABLE FUSELAGE NOSES ARE USED FOR SPECIALIZED INTERDICTION MISSIONS
FIN AREA 49.23 SQ.FT.
NAVIGATION LIGHT
STATIC PRECIPITATOR WICK
RUDDER AREA 23.1 SQ.FT.
TRIM TAB
RADIO ANTENNA
H.F. RADIO ANTENNA
PERISCOPE
50-CAL M.G.
JET TYPE ENGINE EXHAUST MANIFOLD
STATION ZERO
ANTI-GLARE AREA
FORWARD M.G. GUN SIGHT
ACCESS TO FORWARD M.G. AMMO BELTS
FORWARD FIXED 50-CAL. M.G.
FUSELAGE REFERENCE LINE
REMOVABLE FUSELAGE NOSE
TAIL CONE
TAIL SKID
AFT LOWER GUN TURRET IS REMOVED FOR NIGHT INTERDICTION MISSIONS
AUX. FUEL TANK, ROCKETS, WING M.G., & INSIGNIA OMITTED IN SIDE VIEW FOR CLARITY.
TORQUE LINK
STEERABLE NOSE WHEEL
NOSE WHEEL SHIMMY DAMPENER
NOSE WHEEL CANTED FORWARD 12°
NOSE WHEEL ROLLING RADIUS 19"
OIL COOLER AIR EXIT
NACELLE L.G. DOORS
TORQUE LINK
USAF SERIAL NUMBER
USAF INSIGNIA
ADF RADIO COMPASS
FUSELAGE NOSE WHEEL DOOR
BOMB BAY AIRFLOW SPOILER
FUSELAGE BOMB BAY DOOR
USAF B-26D
W.L. NYE

TESTORS

MODEL AIRPLANE CEMENTS

FORMULA "A"

. . . is extra fast drying for quick, easy construction of lightweight models and for on-the-spot repairs. Guaranteed Hot Fuel Proof.

FORMULA "B"

. . . is fast drying . . . the strongest for balsa or hardwood . . . for metal to metal . . . for metal to wood . . . for all general work.

EXACTLY G

TESTOR CHEM

Y GHT ... for every cementing job!
COST A LITTLE MORE . . . WORTH A LOT MORE
TESTORS
MODEL AIRPLANE Cement
FORMULA B
FAST DRYING
Strong!
TESTORS
MODEL AIRPLANE Cement
FORMULA A
EXTRA FAST DRYING
Strong!
TESTORS
MODEL AIRPLANE Cement
FORMULA A
EXTRA FAST DRYING
Strong!
TESTORS
MODEL AIRPLANE Cement
FORMULA A
FAST DRYING
Strong!
TESTORS
MODEL AIRPLANE Cement
FORMULA A
FAST DRYING
Strong!
M L COMPANY • ROCKFORD, ILLINOIS

Radio Control News

by E. J. LORENZ

Wondrous amphibian, by Hank Struck, took fourth at the Mirror Meet. A realistic flier, it performs excellent take-offs on land or sea. The landing gear detaches for water use. Ship is watertight; wing floats are shock mounted.

Your roving RC reporter covers that event at the Nationals, the Mirror Meet, and the annual get-together at Selinsgrove, Pa. Technical notes.

▸ The 1953 Nationals are now in the past but the RC event will be a thing to talk about until the '54 event rolls around.

There was no proven case of outside interference to models in the air. Since three frequencies were used, 27.255 mc, 50-54 mc and 465 mc, there were sometimes three planes in the air at once. There were but few cases of lost control. Wind hampered some flights in that perfect patterns were not always possible. Curry, Bonner and Sewell produced very realistic take-offs with their 6 and 7 ft. ships, often pulling them into the air with a slight touch of up-elevator just before hitting the end of the runway. Take-offs, in general, were commonplace. Lew Andrews performed many touch-and-go demonstrations with a McCoy .09 powered Beam, equipped with Citizen-Ship 465, engine, rudder and elevator control.

Flying a modified Live Wire, Sr., employing a symmetrical wing section and using the Schmidt five channel reed unit, Harold deBolt put on an excellent display of inverted flying, outside loops and vertical S's during evening fun sessions.

The thing that caught our eye the first day was a set of three planes by Charlie Vivell, with fuselage and rudders of fiberglass shell. One ship was entirely covered with fiberglass, over a conventional lightweight framework. One of the most talked about planes was Alex Schneider's (last year's first place winner) racing RC job. A sturdily constructed five ft. plane with a Fox .59 driving a contra-rotating prop, this model was expected to hit 100 mph. Unfortunately, we were not around when a flight was attempted.

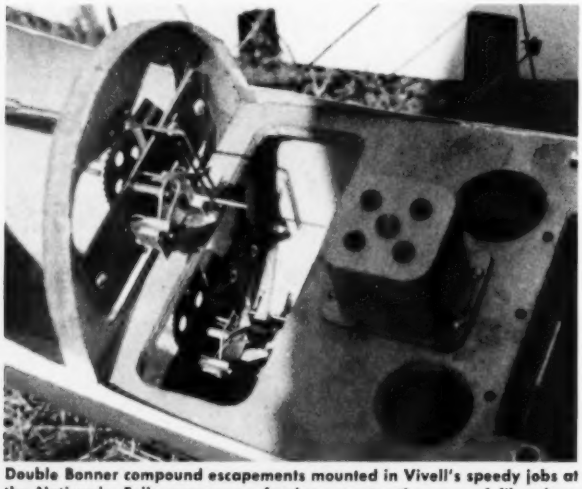
In general, there were no unusual or "weird" designs. This, plus neat radio installations, added many more hours in the air, less tinkering on the ground.

The smallest model at the meet, which made consistently good flights and placed fifth, was a 42 in. Cub .09 powered ship by Frank Adams of Janesville, Wis. This ship used a Lorenz receiver and featured a small pulse actuator weighing about 1 1/2 oz. and which on 3 volts had an exceptionally low drain. Despite the frequently gusty wind, this model made good headway and performance in general was excellent for a small ship.

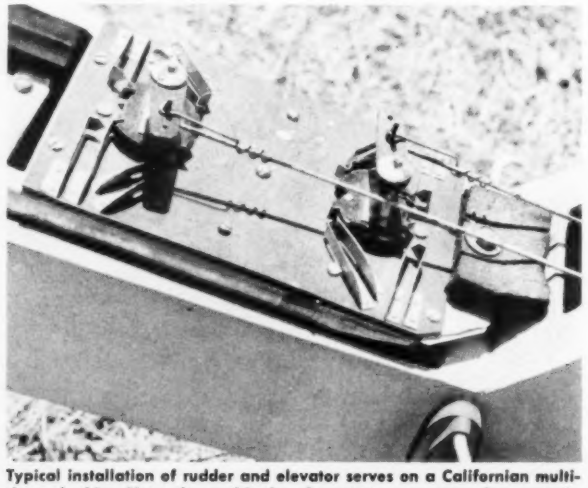
While on the subject of small planes, Steve Eros of Cleveland had a half size Rudderbug with a hard tube transistor receiver. Seems as though it stopped a 5 ft. job doing a take-off groundloop.

The West Coast was well represented by Howard Bonner, John Curry, Lyle Sewell and Ray Regalia. Lyle's 7 1/2 ft. modified Cub, a 9 1/2 lb. ship, was powered with a Spitfire .61 and used five channel audio equipment with electric motor servos. Despite the power and weight, it didn't "bore" into the wind as much as one would expect.

Curry and Bonner had ships with general proportions similar to the Rudderbug. (*Continued on page* 44)



Double Bonner compound escapements mounted in Vivell's speedy jobs at the Nationals. Fully monocoque fuselage construction was of fiberglass.



Typical installation of rudder and elevator serves on a Californian multi-channel ship. Note the multitude of contacts necessary for controls.

YOU NEVER DREAMED SUCH PERFORMANCE POSSIBLE UNTIL YOU FLY KENHI'S NEWEST

SMOOTH REACTIVE — POSITIVE

CONSTRUCTION AT IT S EASIEST THE KWIK-LOK WAY

PANTHER

For .29 to .35 Engines 48in. Wingspan 500sq.in. Wing Area - Weight 26 oz.

Compare these features:- Complete hardware, KENHI processed diecutting, notched leading and trailing edges, AAA grade balsa, covering, diecut windshield, shear-cut plywood, hinge material, formed landing gear, leadouts, pushrod and full size plans.

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72" Wingspan - For .19 to .35 Engines

Over two years in development. Thousands of flights logged. All types of radios used with greatest success. An absolute must for anyone interested in radio control. Note high stabilizer position and scale appearance. Radio Compartment 4 x 9 x 7 deep with a 5 x 2½ access door aft of cabin. Cabin windows for visual inspection.

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BOBCAT

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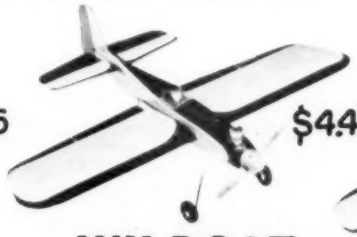
The ideal sport-combat trainer. Easy to build, complete kit, nothing more to buy except tank, wheels and liquids. Smooth and easy to fly.



$4.45

WILDCAT

37" Span-For .19 .35 Engines

Features:-Flaps, highly prefabricated, complete with all hardware, AAA grade balsa and full size plans. Ideal for the aerobatic student.

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COUGAR

54" Span-For .29 .35 Engines

The *KING* of the Stunt Circle. Aerobatic flying at its best. A decided thrill to fly. Kit is complete, as are all *KENHI* Kits. AAA grade balsa, complete hardware, full size plans with step-by-step instructions. the *KENHI* Cougar Kit is chuck full of goodies.

Designed by
HI JOHNSON

FLY KENHI AND FLY THE BEST

Burbank, California

Thief of Power

(Continued from page 23)

to vibrate badly at 8,000 rpm, but behave perfectly at 12,000 rpm, simply because the inertia of the heavy components prevents their oscillating fast enough. As soon as they fail to oscillate in harmony with the engine impulses, vibration ceases. A light structure would tend to oscillate at a higher frequency. Thus every engine, mounting and plane does have a vibration period, and weight, rigidity and torsional magnitude control the rpm range over which it occurs. The object of the designer is therefore to arrange that the various factors regulate the occurrence of this period at an engine speed outside the useful operating range.

To digress for a moment, a typical problem of this kind arose during development of the Amco 3.5 Diesel. The object behind this design was to achieve a high power/weight ratio for stunt controlline, and resulted in some .3 bhp for a weight of 4 oz. The high cylinder pressures of Diesel operation aggravate vibration troubles, and a severe period occurred between 7,000 and 8,500 rpm on all but the heaviest bench mountings. Efforts were accordingly made to move this period lower down the rpm scale by attaching various counterweights to the crankweb. However, it was found that around 1/2 oz. was the least weight able materially to improve the condition, and we finally decided that such an increase in engine weight was unjustified since the useful rpm range lay well above the critical speeds. Consequently the Amco continues in production to this day with no counterweight, and owners who insist on loading this high speed engine with big slow props continue to complain about vibration.

The moral behind this story is that if you experience severe vibration, try altering the engine speed with different props. Stunt flyers will recall hearing strange noises, and even feeling line vibration, when the job slows down in tight maneuvers, and yet as speed picks up, everything works smoothly again. You simply flew into a vibration period.

As a rule, vibration is most evident at medium speeds and least at high speeds, as the RC fan who has experienced a skipping escapement will testify. However, it is frequently undesirable to run at high speeds because of the lower efficiency of small props. A popular compromise between bhp and prop efficiency for power duration seems to be around 12,000 rpm with most engines, and if the kite tries to shake to pieces at this speed, the best field for research is the mounting system.

The logical place to counteract vibration is at its source, and since the trouble emanates from the piston, a mounting should be enabled to supply its absorption at the closest point to the plane of piston travel. This is a good argument in favor of beam mounting. However, this advantage is lost if a rear mounted tank demands long unsupported bearers, but if beam mounts are short and firmly anchored, with a ply bulkhead right behind the engine, they are hard to beat. The speed pan mounting system is probably ideal, especially if rigidly attached to the rest of the model. Radial mounts are good if used directly onto the crankcase. A tank mount increases overhang and vibrational effect, but is understandably favored for convenience. Again the mounting bulkhead or firewall should be thick and firmly attached to heavy parts of the model. The various types of pressed steel or aluminum brackets are not very satisfactory, nor are knock-off, crash-proof devices. Mass inertia and rigidity are the essence of a good mounting.

A practice invariably used by the writer when designing a model is to cut out the firewall from 1/4 in. hard plywood, slot in and gusset the beam mounts, lace the landing gear to the firewall with braided controlline wire through small holes, and cement thoroughly. Then mount tank, timer, batteries if any, control system, etc., onto firewall or immediately behind on the beam mounts, and if at all possible, the wing as well. The result is a basic structure with everything heavy virtually integral with the engine and contributing its inertia to the absorption of vibration. This assembly then has the fuselage built around it with a solid balsa bumper block under the engine and solid nose and side pieces unifying beam mounts and bumper block.

It should not be necessary to mention it, but one sees so many motors harnessed with undersize bolts, heads pulling through the wood, fatigued and broken bolts, loose nuts, etc., that a little righteous indignation will perhaps be forgiven. After all, they won't work without the poor old engine, and you feel an awful fool when you start up and flip the machinery clean out of the model. It happens!

A good rule is to use the heaviest bolts possible even if it entails drilling larger lug holes. All the racing engines have sufficient metal to permit this, but the lugs are too fragile, even with standard holes, on many other types. The bolts are less likely to vibrate loose if inserted through a brass plate .040 in. thick and then upward through the beam mounts, or outward with a radial type, then through the mounting lugs and terminated by nuts, locknuts and homemade tab washers. When tight, the bolt heads should be soldered to the brass plate.

Highly elaborate? Yes, but well worth it, because they positively will hold that engine firm, even if the wood softens from fuel soaking. The brass plate is much superior to plain washers because it will not buckle, and spreads the compression over a larger area of wood. Also it interlocks the bolt heads.

A phenomenom that has puzzled most of us is the way a big .60 powered stunt job will come very close to flying at the same speed as an identical engine in a speed model having a fraction of the drag and less weight. A simple ground check with a tachometer, using similar props, immediately shows that the heavier stunt mounting allows the engine to rev faster, simply because it damps a greater proportion of vibration, and thus diverts more power to the prop.

In the air, a good speed ship eventually picks up to where rpm exceeds the frequency at which the model can harmonize, and then the motor gets going. A bad one is often bad because it does not do this.

Finally, the correct handling of vibration can save a lot of trouble in other directions. Fuel feed is improved. Soldered joints on tanks, etc., hold up better. Engine wear is considerably reduced, especially in the crankshaft bearing. RC relays and escapements maintain adjustment and have less tendency to skip. Radio tubes last longer and, best of all, models last longer. It is well worth investigating.

END

Super Civy Boy 61

(Continued from page 21)

the builder. If you prefer internal spars or any other construction method, go to it!

Before covering model, use a sanding block with good varied grades of sandpaper. The worst place to try to save time in model construction, aside from secure cement joints, is in sandpapering. Most often it is wise to go back to the model after you think it is smoothly sanded, ready for covering, and—sand some more. The proper use of sandpaper, and time spent sanding, are the only secrets to craftsmanship in models. We all know well that our covering material, be it Jap tissue, Sky Sail, or silk, will hide a multitude of construction botches. However, we should also know that our covering cannot hide poor sanding. If anything, our covering will emphasize our errors in sanding. Let us say that we may have spent 40 hours constructing a model, only to spend 30 minutes sanding, and then: Quick Henry, the Flit gun; let's cover it. This is only one person's philosophy: If a model is worth 40 hours in cutting and cementing, this model deserves 4 hours with a good strong arm connected on one end to a piece of sandpaper. It does make a big difference, and the finished model

(*Continued on page* 34)

CONRAD CONROD
BY ROD GOODEN
NO MORE WINDING BY HAND - OH HOW CLEVER CAN I GET? A SHAVER SOCKET, A CAR, AND A MIXMASTER
WHY I CAN EVEN SET THE R.P.M. - COUNT OFF A MINUTE, AND I'VE GOT IT - OH YOU CLEVER, CLEVER BOY!
THERE! PUT THE NOSE BLOCK IN PLACE, CHECK THE ADJUSTMENT, AND LAUGH AT THE SKEPTICS -
10 SECONDS LATER
AWRIGHT LAUGH YOU IDIOTS SO IT WAS WOUND BACKWARDS I'LL WIND IT FROM THE REAR NEXT TIME
HAW HAW
HA HA
HAW HA HA HA

the thrill of JET POWERED FLIGHT!

Just to look at a Jetex engine is an exciting experience . . . for it gives the impression of power and speed . . . and makes possible models of exceptionally clean design and simple construction.

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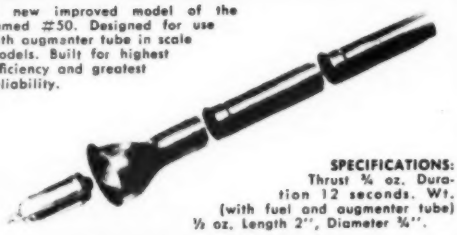
In a few seconds you see the high velocity gas stream come out . . . and then you feel your model pulling forward as thrust exerts itself. The plane wants to leave your hand and speed skyward. A gentle launch and she's off . . . to a beautiful flight without starting problems, vibration or torque to mar its flight and your enjoyment.

Fly a Jetex-powered model. Discover for yourself the thrill of jet-powered flight.

AND NOW TWO GREAT NEW JETEX ENGINES
in addition to the popular #50 and #150

A new improved model of the famed #50. Designed for use with augmenter tube in scale models. Built for highest efficiency and greatest reliability.



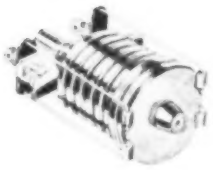
SPECIFICATIONS: Thrust ¾ oz. Duration 12 seconds. Wt. (with fuel and augmenter tube) ½ oz. Length 2", Diameter ¾".

$2.95*

Jetex #50 Contest Special

Jetex Scorpion "600"

The most powerful and efficient Jetex engine yet developed. Thrust exceeds weight by nearly 300%. Produces peak thrust from beginning of run.



SPECIFICATIONS: Thrust: 6 oz. Duration: 10 sec. Wt. (with fuel and augmenter tube) 2.2 oz. Length 2¾", Diameter 1¼".

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*includes augmenter tube, fuel and accessories

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Free-flight scale.
*Aeroformed construction.
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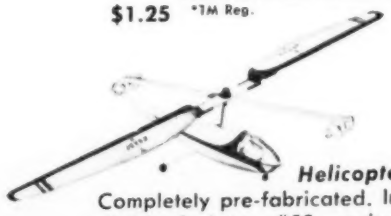

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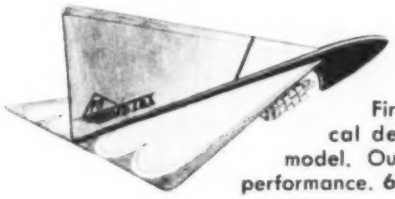

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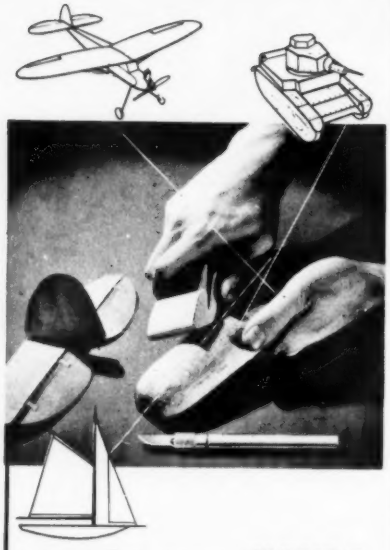

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will not bear resemblance to the backbone of a hungry frog.

After a good sanding, give entire outline framework, bottom of wing ribs, and top wing ribs at dihedral breaks two or three good smooth coats of clear dope or surface sealer. Sand again lightly with 320—400 sandpaper and then the covering will be easy and smooth. Suggested are 8 to 15 coats of clear dope applied with a 1 to 2 in. soft brush for a good finish. Add two per cent castor oil to clear dope for the final one or two coats of clear dope. The castor oil reduces the curing tautness of dope and prevents warps as a model ages. Use your favorite clear hot fuel proofer varnish for a last thin top coat.

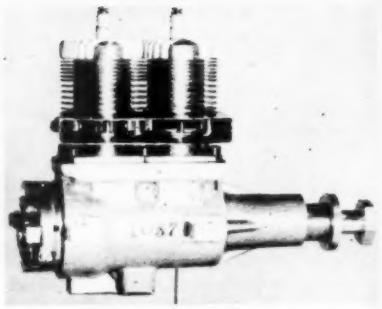
I prefer to use nitrate clear dope. However, butyrate dope will work as well and is preferred by some builders.

Before test flying, make a final wing and stabilizer alinement check; use own pet method of alining keys for stabilizer and wing. Inspect the model closely for warps. Then check test glide and get model to glide smoothly with the nose always down. If this model is built with anything near the proper given incidence setting, it should glide without any ballast or addition of incidence shims. I set my models to glide in a wide left turn for the first power flight of moderate power with the propeller put on the engine backward to reduce thrust.

Do not use rudder to adjust left turn in the glide. Better still, don't tamper with rudder for any glide or power adjustment. It is much safer always to leave the vertical fin set at zero. Use the tipped stabilizer method for turn in the glide. To have glide turn to left, tip right side of stabilizer downward. This is done by cementing approximately 1/16 strip of balsa along left side of stabilizer platform. For these adjustments, assume that we are standing behind the stabilizer looking forward toward the pylon.

Let us assume the model has 3 to 4° downthrust built into the model. We will need to have 2° of right thrust before we begin the first low powered flight. The model should climb in a wide circle to the right.

Make two or three flights before changing anything or before turning the propeller around to normal thrust position. After these two or three flights, if the model repeats itself in wide right nose up turns, turn the



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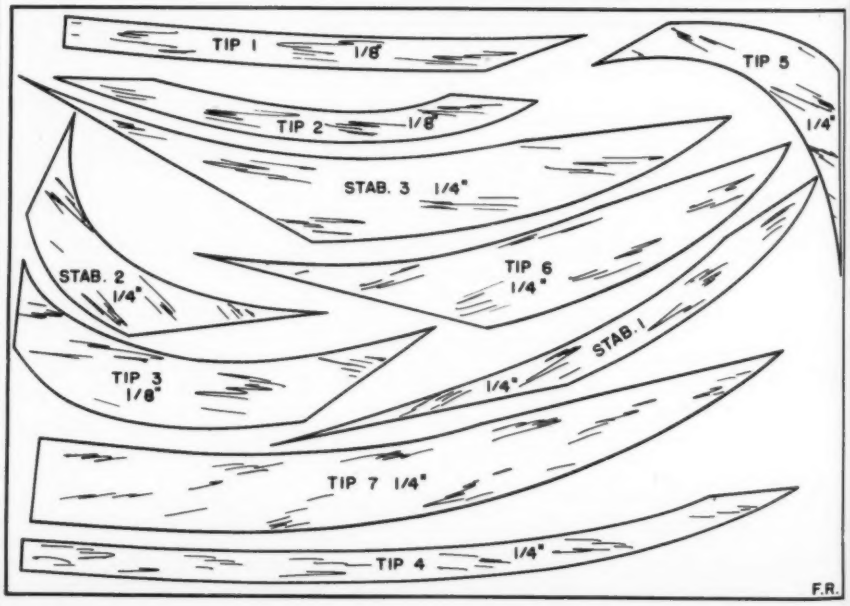

The Super Civy Boy patterns on this and opposite page are half size. To enlarge them, it is suggested

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prop around for normal thrust. When you do this, add another degree of right thrust to compensate for the additional torque resulting after the propeller is turned back to normal. It is possible that it may require 2° more right thrust, making a total of 4° for this next power flight. This flight should be made without full lean-out of needle valve. Let engine run as rich as possible without choking up and cutting a helpless distance away from the launch.

With this flight the ship should go up widely and smoothly to the right at about a 45° angle. If it does, now is the time to strap a couple more rubberbands onto the wing and let the engine peak. The model should now be ready for full contest adjustment. The wide right turn of the previous flight should become a vertical right nose-up spiral.

By slight adjustments of our right thrust and tipping the stabilizer for left glide we can have almost any power flight pattern.

Most of us dislike giving out warnings, but here is a reasonably good one: Don't allow this ship to fly left under power.

The Civy Boy 61 will handle .19, .23, .29 and .32 displacement engines. END

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(Title 39, United States Code, Section 233)

OF MODEL AIRPLANE NEWS published monthly at Silver Spring, Md., for October 1st, 1953.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Jay P. Cleveland, 551 5th Avenue, New York, N. Y.; Editor, William Winter, 551 5th Avenue, New York, N. Y.; Managing editor, none; Business manager, none.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) Air Age, Inc., 551 5th Avenue, New York, N. Y.; Jay P. Cleveland, 551 5th Avenue, New York, N. Y.; Yvonne P. Johnson, 551 5th Avenue, New York, N. Y.; Grace E. Johnson, 551 5th Avenue, New York, N. Y.

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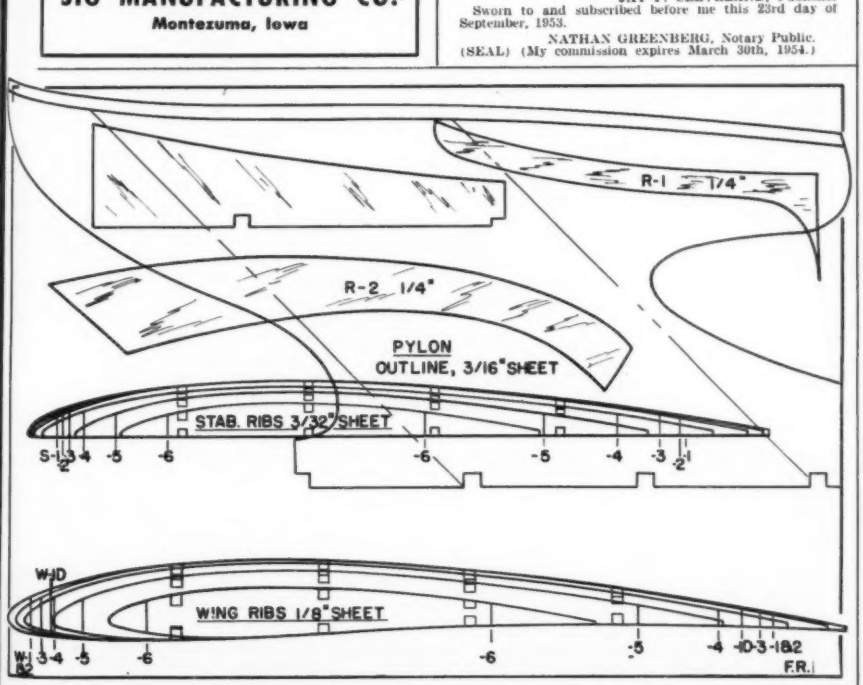
JAY P. CLEVELAND, Publisher

Sworn to and subscribed before me this 23rd day of September, 1953.

NATHAN GREENBERG, Notary Public.
(SEAL) (My commission expires March 30th, 1954.)



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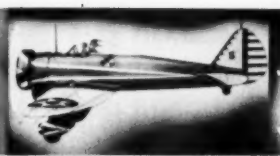

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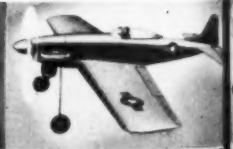

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World Glider Championship

(Continued from page 13)

some modelers still tried to get in their first round flights. George Perryman was one of the unlucky ones. After spending the first half of the round searching unsuccessfully for his lost model, he decided to use his spare, and in the general confusion caused by the haphazard towing procedure and the teeming rain, he tangled with two other towlines and his model was pulled into the ground. Ed Smull also flew at this time, but Doré's model proved unstable on the line and in the end he only managed to rack up a meager 35-second flight.

The British boys had an even worse time in the rain, since both their hastily built models—flown by Tony Brooks and Geoff Byrd—had the wings fold up on the towline. As the round came to a close at 6:00 a.m., a glance at the rainstreaked scoreboard showed that somehow all but a handful of the competitors had managed to get in flights of a sort and nine five-minute maximums had been recorded. It was obvious that flying would have to be cancelled for the remainder of the day, since even the public address system had been put out of action by the torrential rain. So with the water squishing in their shoes, all retired to the hangars, where morale was somewhat restored with glasses of Yugoslav plum brandy; then finally, back to the hotels for breakfast!

For many, the day was spent in repairing and drying out their models, while the American team returned to the airfield to have a last look for George's lost Nordik, which, after several hours, they finally ran to ground. For those with their models still intact, a trip to the beautiful Vrata Valley, close to the Italian border, was arranged, followed by a reception which provided an opportunity of renewing many old friendships, and making new ones. Light hearted speeches were delivered by representatives of every competing nation and Hans Hansen jokingly said that he looked forward to meeting us all in Denmark next year for the '54 A-2 Championships. Everyone laughed at the time, but the next day he backed up his prediction by winning the contest! Addressing the gathering on behalf of the American team, Chris Zaic (who was born not far from Bled) made a big impression on the Yugoslavs by speaking in Slavene, their native tongue.

Following a team managers' conference, it was decided to hold both the remaining rounds on the following day, Sunday, August 23. On arrival at the airfield at 5:30 a.m., conditions looked pretty good; there was no rain, only scattered clouds and hardly any wind. As the clouds capping the surrounding mountains lifted, they revealed the peaks now covered with snow! The second round started at 6:00 a.m. and it soon became apparent that the thermals were stronger than on the previous day and by the end of the round an hour later, 11 competitors had put up five-minute flights—although, with the exception of Hans Hansen, none of these had scored maximums on the previous day.

George Perryman flew his "first" model in this round, but the surfaces had become so badly warped during its stay in the cornfield, that he only managed to get 70 seconds. Ed Smull still found difficulty in towing up Doré's model and made only a slightly better flight than in the first round. Geoff Byrd made the British team happy by scoring a maximum with his patched-up model, while Tony Brooks managed 3:31 with his entry. After half an hour's break, the third and final round began at 7:30 a.m., with Hans Hansen leading the field with his two maximums, although Germany's Karl Heinz Denzin, Yugoslavia's Bora Gunic and Holland's L. Bausch were all hot on his heels—so it still looked like anybody's contest. To make sure of maintaining his lead over Denzin, the Danish entrant needed to score at least 4:46 on his final flight.

Just 10 minutes after the start of the third round, Hans Hansen paid out his towline and pulled his model up overhead for yet another perfect five-minute-plus flight—to win the handsome Swedish Cup and become the World Glider Champ for 1953. Denzin took second place with a total of 14:3, flying the same model he had earlier in the year used to win the German Nationals A-2 event. Hansen won the '53 Danish Nationals with *his* model—so it was obvious that the success of these two top glider men resulted from their skill at A-2 flying and not just lucky breaks.

Templier of France, who had been flying sixth, scored a second maximum on his last flight, to move up into third position with a total of 13:55, pushing Bora Gunic and L. Bausch into fourth and fifth places respectively. Five maximums were scored in the last round and the final team placings were Denmark first, Germany second and France third.

Ed Smull made his best flight (2:13) in this final round, but Perryman's time was under the minute mark and the final posi-

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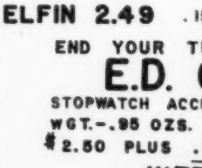

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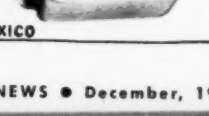

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tion of the American boys was way down the list. The British fliers turned in a little over two minutes each this time, Geoff Byrd placing highest in thirty-ninth place on a two flight only aggregate. Just in passing, we later heard that the British team stayed on for the four-day Yugoslav Nationals and Geoff managed to gain second place in the A-2 event with his model, The Last Straw.

Later in the day, our hosts arranged yet another trip through the beautiful Yugoslav valleys and forests, this being followed by a prizegiving banquet back at Bled. In addition to the individual and team trophies, a special award went to Germany's Max Hacklinger (second last year) for the best made model at the Championships. Since both Hansen and Denzin were to leave next day at the crack of dawn, they kindly loaned us their models and we spent what little time there was left after the banquet in drawing the three-views which illustrate this report, falling asleep where we sat after we'd finished!

Hansen's model had a fine finish and he told us that he had used four coats of clear dope, rubbing down between each one with wire wool. The fuselage was planked up to the rear of the wing position and then entirely silk covered. Weight was 1-1/2 oz. over the specified minimum of 14.46 oz. Balance point was at mid-chord and the wing airfoil was an original section with a sharply reflexed trailing edge and a flattened mid-portion on the upper surface. The auto-rudder was neat, the release sliding onto the tow hook and only detaching as the tow ring fell free of the model. Tail moment arm was three wing chords and the nose length 1-1/3 wing chords. Dihedral was only moderate and confined to 1/6 span tip panels. The 21 per cent area stab was thin, slightly undercambered and the fin area was equally divided above and below the stab. Wing area was 412-1/4 sq. in. and stab area was 87-3/4 sq. in.

To stand up to the tough flying conditions experienced out in Denmark, plenty of hardwood was used in the construction of Hansen's model, which accounted for the model's overweight. In the detailed building plan which will appear in a future issue of MAN, the designer has substituted equivalent strength balsa for the hardwood members, since this is better suited to American conditions.

Denzin's model was typical of the type favored by German designers today, consisting of a long pod-and-boom fuselage with the entire fin-area underslung. Both the wing and stab sections were thin and undercambered. Weight was just over the minimum required: 14.6 oz. Wings were in two pieces, joined by lengths of 3/32 in. wire plugged into tubes. Dihedral was on the 1/5 span tip panels only. Stab area was 20 per cent of the wing, tail moment arm 4-1/4 wing chords, and nose length, 2-1/2 wing chords. The model balanced at 85 per cent chord for calm air conditions, with weight added to the nose and the stab. TE packing increased slightly for thermal flying.

As for the other top models: Templier, who placed third, flew a simple, twin-finned, shoulder-wing box-fuselage type. Bora Gunic's fourth place design differed from his last year's winner in that it had a much longer semi-profile fuselage, with the required cross-section in the form of a tail-pod. Both stab and fin area were very small. L. Bausch's fifth place model was a conventional plug-in shoulder wing with about a 3-1/2 chord tail moment and a short stubby nose. All of the top five models had one design feature in common: that of dihedral on the tip panels only.

Knowing that it was intended to hold the '53 meeting in as near still-air conditions as possible, many of the contestants had obviously put all their eggs in one basket and

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developed models that would pay off in this kind of weather. Judging from the early morning test flying we saw going on prior to the contest, there were several models capable of doing *well over* five minutes every time—from a standard 328 ft. line. Had the expected weather conditions prevailed at the contest, there would almost certainly have been a good number of treble maximums in this year's results.

There were so many interesting designs at the meeting, it would take pages to describe them all, so the photos will have to speak for themselves. However, we couldn't finish without at least mentioning two outstanding models that caught our attention. Oskar Czepa had a graceful development of his Toothpick '51 winner, which featured an ultra-thin solid balsa wing and stab. He put up a maximum in Round One, but the rain upset the delicate trim and he didn't stand a chance after that. His fellow Austrian team member, Gerald Skalla, also flew a sheet surfaced design (he placed sixth), which had elliptihedral tips and a bird section based on that of the Flamingo (Czepa used an Eagle section).

Several entries sported elliptihedral tips and one mid-wing Dutch entry had full-span dihedral of this kind. We noticed a few models fitted with turbulators (Denzin had one on his stab), some slightly swept-forward wing plan forms and a frequent use of dihedralled stabs. As usual, auto-rudders were a standard fitting. The most noticeable trends, however, were toward longer fuselages, smaller stabs (one Yugoslav entry had a 9 per cent area stab), smaller fins and higher aspect ratio wings. From the many fine examples we saw at this contest, we can quite definitely say that model glider design has reached a stage at least as advanced as that of the present day Wakefield—and that, as anyone who attended the '53 Wakefield will tell you, is saying plenty!

RESULTS OF 1953
A-2 WORLD CHAMPIONSHIPS

		1	2	3	TOTAL
1.	Hans Hansen (Denmark)	300	300	300	900
2.	Karl Heinz Denzin (Germany)	285.4	300	258	843.4
3.	Jean Pierre Templier (France)	300	235	300	835
4.	Bora Gunic (Yugoslavia)	300	270	254	824
5.	L. Bausch (Holland)	300	251	265	816
6.	Gerald Skalla (Austria)	200	300	300	800
7.	Walter Schönborn (Saar)	211.7	288	300	799.7
8.	Giovani Federici (Italy)	452	300	281.3	733.3
9.	Lennart Persson (Sweden)	300	243	189	732
10.	Borge Hansen (Denmark)	242	290	195	729

the Fokker D-7

(Continued from page 15)

wire, formed to shape and located. When the floorboard assembly is complete it is located in the fuselage and cemented. The elevator and rudder cables are then connected to horns in the tail assembly. The instrument panel is then built and cemented into place. The compass used was on a small magnifying glass which was found in a novelty shop, its size to scale. This is now placed in position. Now the hand pump is built and placed on the right side of instrument panel. The seat frame is built and cemented to the fuselage, then the seat made and cemented into place. The cushion is of sponge rubber cemented to a plywood base covered with suede and pins used for a button effect. The throttle and spark control are then made and installed on the left side of the fuselage. The tachometer is mounted on the tubular cross-

(Continued on page 42)

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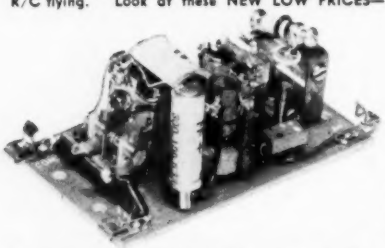

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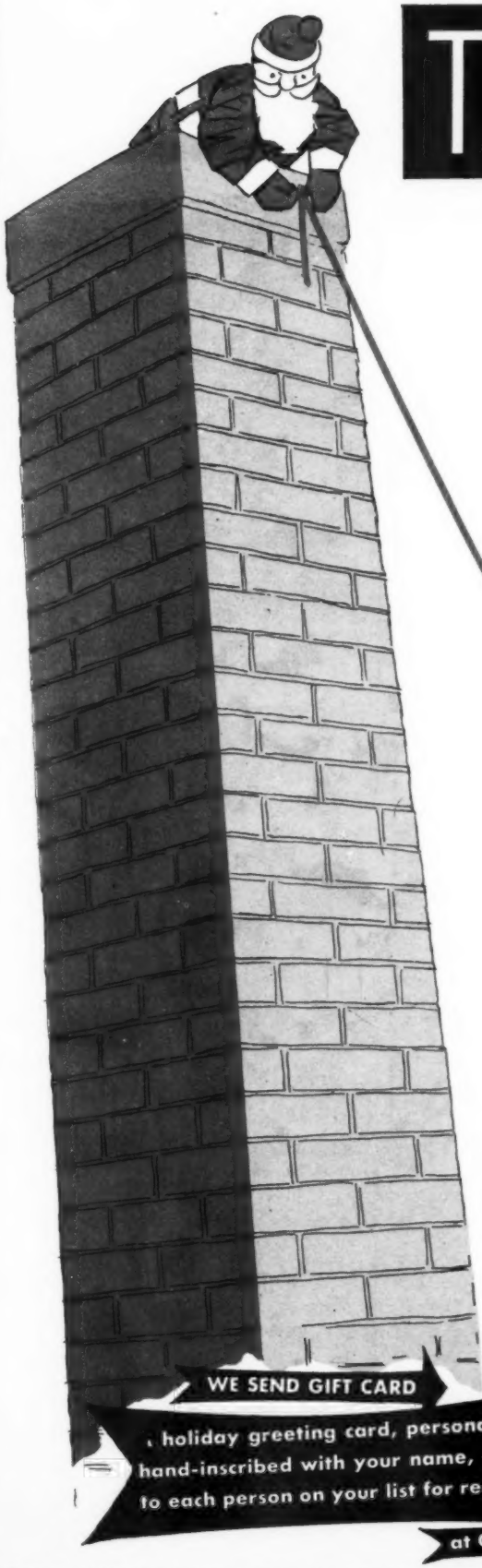

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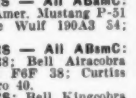

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bar on which the rear gun mounts are located. Build the front gun mounts and locate. This completes the cockpit except for the machine-guns.

At this time the formers A, B, C, D & E are made and placed into position. The cowl covering A and B formers is made to template and 1/16 balsa fairing is placed over formers C to E. The tail skid and landing gear are next to be built.

The entire tail skid assembly is made as a unit and installed. The main body of the tail skid is cut from 3/16 in. plywood. The metal pivots, brackets and the shoe are made of 1/32 in. brass sheet. The shoe is secured to the tail skid by drilling two small holes, placing pins through them and soldering. The swollen portion on the bottom of the shoe is built up of solder. The pivot bracket is made up of two parts: one flat and cemented into the slot at base of diagonal dowling and wrapped to form the pivoting body; the other formed around the tail skid and attached to the pivoting body by a 3/48 machine screw and nut. This part is secured to the tail skid by drilling a small hole through bracket and skid body, placing a pin through and soldering. The bracket at top of tail skid is formed and cemented into position; the spring for shock action is secured to it at one end and secured through eyelet on diagonal dowling at the other end. The tail skid assembly is then cemented into position in the fuselage.

The landing gear is 1/8 steel wire formed in two sections, front and rear. Two metal plates are made of 1/32 brass sheet. These brass plates bond the two landing gear struts together and are the foundation for the spreader bars and shocking mechanism and are also slotted for the axle travel. After these plates have been soldered to the landing gears the spreader bars are soldered into place. Cut the axle shaft from 1/8 steel wire to length and place through slots in brass plates. Evenly divide the shaft and solder a washer on each end allowing 1/32 in. clearance between plate and washer. This prevents the axle from sliding out of position. Small springs are used for shock cords. Small metal brackets are wrapped around top of landing gear wires and drilled and bolted to the front side of bulkheads No. 2 and 3.

Before the lower landing gear wing is made and the struts faired, the nose block is made and the bottom of the fuselage planked to the lower wing recess. The nose block is carved to shape from solid balsa. The opening in the front of this block allows sufficient engine cooling and scale radiator appearance. The radiator grill is made of fine copper mesh wire and cemented into place. Locate the radiator and mount, cementing to No. 1 bulkhead. After this has completely dried, plank the bottom of the fuselage nose section. This hides the cross-over wire of your landing gear struts. The hole for the propeller shaft of the engine you have chosen is now cut in the radiator shell. We found in using an Atwood .60 that an extension was necessary. We used an Atwood 49-51 extension shaft by filing off the sixteenth flange at the back of the extension. This slips over the 60 shaft against the original ignition cam and the propeller nut and washers from the 49-51 are used.

The landing gear wing is built from the drawing, then cut at the center line and cemented over the landing gear assembly. The front strut crosswires are added. Then the landing gear struts are fared.

We found it impossible to locate wheels of the exact scale size and authentic appearance. Therefore, we made our own in the following manner: the core of the wheel is made of 1/4 in. plywood with two cone shaped discs on each side. The discs are made of metal from an old fuel can. Select

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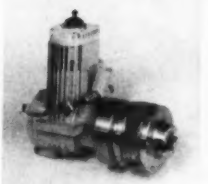

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CRAFT, MODEL & HOBBY INDUSTRY
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flat material. The templates are found on the drawings, the seam is lapped 1/16 in. and soldered securely to form the proper cone.

The rim flange is then flared out. 1/8 in. inside diameter brass tubing is put through the center and acts as a bushing. The wheels are then lined up very carefully and soldered to the discs on all sides. A band 1/4 in. wide cut from an old fuel can is wrapped around the plywood core and tack soldered securely to the discs, then solidly soldered around, and filed to a radius for tire recess. The tires are made of 1/2 in. round sponge rubber found in the windlacing of automobiles and available at any auto trim shop. Peel off the fabric cover, fit around the wheel and secure with any good rubber cement. The air valve hole on the outside disc of each wheel is drilled 1/4 in.

All of the lower wing parts should be cut first. Both of the lower wing spars taper from the bottom and the top as well. Mark wing rib positions on spars, slide ribs over spars and locate. Notch the trailing edge for the wing rib recess and cement into position. Then taper the leading edge and cement. Templates for lower wing strut brackets are on the plans (make four). The brackets are formed and holes drilled, then they are located and the spar which has been reinforced with 1/16 in. plywood is marked for drilling. These brackets are bolted into position with 3/48 machine screws and nuts.

The cap stripping on the leading edge can now be made and cemented into position; this is on the top and bottom of each wing. After the wings are complete the trailing edge is scalloped. Sand this carefully so that the points will not be broken. A 1/16 plywood plate is cemented on top of the wing spar at center section. This bolts to the fuselage at the lower wing recess where a 1/16 plywood plate is placed. Both plates are fitted together, marked for the four bolts and drilled. The bolts are then placed in fuselage section from the top and cemented securely. The four bolt holes in the lower wing section are elongated as the lower wing leading edge is slid into position first and the back edge falls into place. Bolt the wing to fuselage temporarily. Build the lower wing cover door and hinge at front, with a brass spring friction lock placed at the back. This holds the door in position.

The upper wing is built from the plans in a like manner. However, the spars taper only from the bottom. The outer wing strut brackets are made from template and mounted on the underside of this wing in the same way as the lower wing. Take special note that you have placed the brackets on the two wings in corresponding positions. The inner strut brackets are made differently from the outer wing strut brackets, as they angle in toward the fuselage.

All of the wing tips are made of solid balsa carved to shape. After the construction of both wings is completed, make the outside wing struts. The exact size will be found on the drawings. All of the struts are made of 3/16 brass tubing. When the N struts are completed bolt them to the wings to suspend the top wing above the model. The inner struts are then built. All of these are flattened out on the lower end where they fasten and bent to desired angles, filled with solder for reinforcement. These are marked A, B, C and D. B and D are through struts; they are bolted to the wing with 3/48 machine screws and nuts and wood screws secure them to the fuselage framework. There are two each of B and D. After these struts are in place, A strut is cut to length and is fastened to the motor mount with wood screws, filed carefully to fit at top of B strut and tack soldered. There are two of these. C strut is made in like manner but is screwed to the upper longeron. When A and

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C struts have been tack soldered, place model in inverted position and solder A, B and C struts together securely, checking wing alinement. The wings and D strut are removed at this time and the soldering is filed smooth. These tripod struts are left on the model while the aluminum cowl panels are made.

The cowl panels are made of 2S-H14 sheet aluminum. They are cut from templates shown on drawings. The louvers are then cut and shaped and the doors made and attached. The louvers on the two front panels are different, as noted on the plan. Drill the holes for attaching to fuselage and attach with small wood screws. Make hole in front panels for A strut to pass through and slot to outside edge. This allows panel to be removed and replaced without disturbing the strut. Before painting, these panels must be primed with zinc chromate. Remove the panels and struts before you cover.

Silk or a heavy grade of Silkspan can be used. Apply three coats of clear dope before applying color. For scale color detail refer to the Aug.-Sept., 1951 issues of MAN. After your color detail is finished, the external scale details can be completed.

The receiver body of the machine guns is made of balsa; add the hardware, then make the barrels and attach. The barrels are of very thin metal and the holes made with a small punch which may be an old screwdriver ground to shape. The barrels are stamped with a hardwood block for a backup, then formed in a tubular shape. At both ends of the barrel cylinder add a small balsa plug. Holes are drilled at the base of the balsa plugs to receive a 1/16 in. dowling passed the length of the barrel and extending 3/16 in. beyond the back plug to help secure the receivers. Cement barrel and receivers securely together. A small ring crosshair site is made and cemented to the top front edge of the machine gun barrel. The nozzles are carved to shape and cemented to the front of the guns.

Mount the guns. Running a pin through the small holes in the mounts will secure your machine guns to the fuselage. The ammunition belts and shell ejection tubes are now made and secured to the fuselage and receivers. This completes construction of your model. The gas tank and engine can now be installed and the model assembled.

END

Radio Control News

(*Continued from page* 30)

These ships weighed between 6 and 6 1/2 lb. and featured five tube, two channel audio filter receivers. The actuators for rudder, elevator and engine were, naturally, Bonner escapements. Another example that the escapement is far from being counted out, even on multi-channel installations. Inverted flying seemed to be second nature to these two ships.

From the East Coast the boys from Jersey were out en masse with Fran McElwee flying a last year's converted 6 ft. low wing ship. This plane used a Schmidt five channel reed unit and was capable of low level maneuvers.

Last but definitely not least was the winning of first place by Jack Port of Fairborn, Ohio. Jack spent all of the week until Thursday at a nearby abandoned airport checking his ship. This procedure really paid off in a well trimmed model. The plane itself was a 5 ft. job using rudder-only control and Jack's own design receiver. This was a hard tube receiver employing a CK5672 tube and a Sigma relay. The plane and escapement were modifications of the writer's design of several years ago. Incidentally, the radio installation in this model is one of the neatest we've ever seen and this one item alone gave him more time to concentrate on trimming the plane itself, instead of repairing and checking the radio.

NEW YORK MIRROR FLYING FAIR

The fifth New York Mirror Flying Fair saw the weather hot and the wind steady at about 18 mph. Approximately 30 ships were on the field, including Live Wires, Rudderbugs, Bootstraps, Robots and original designs. Radio equipment included the ED line of carrier and tone operated sets, Miller and Lorenz receivers. Aerotrols, simple singles, C-S 465 mc and originals using single RK-61's. The majority of flying was done on 27.255 mc and an occasional trace of interference was picked up on this frequency by several DF loop receivers. 50-54 mc and 465 mc were also used.

Mr. F. P. Jacobs of Woodridge, N. J., took first place with his Forster .29 powered Rudderbug. Using two single RK-61 receivers in the 50-54 mc band, rudder, elevator and engine control were obtained through the use of Bonner escapements, and a pulsed Wilson electric motor. Fran McElwee of New Jersey came in second with his original Robot, using a Lorenz receiver and rudder actuated by an original escapement.

We did see some wonderful amphibian flying. Henry Struck flew his new 5 1/2 ft. 550 sq. in. creation powered with an Arden .199. Rudder-only was had with Aerotrol escapement and receiver. The entire hull was waterproofed, even to the extent of a rubber gasket on the radio hatch cover. Take-offs and landings, on the removable two wheel gear, were perfect and we understand the water performance characteristics are likewise perfect.

The Mirror Meet uses a basic point system and no particular pattern has to be followed when flying.

EASTERN RC CONVENTION

The third annual Eastern RC Convention was held at Selinsgrove, Pa., during the Labor Day week-end. Perhaps this get-together should be more affectionately known as the RC Rainmakers' Conference since this is the third year in a row there has been rain for at least one and a half of the three days.

The Pittsburgh Flying Circuits are the originators and directors of this unique meeting of RC manufacturers, writers, designers, committeemen, etc. There is no contest flying but everyone gets in the air. The days, weather permitting, are spent in flying and the evenings are filled with bull sessions. At this session it was felt that if more groups throughout the country began such events over week-ends or some long holiday week-end, RC work in general would be greatly stimulated.

It was brought to the attention of Walt Good, chairman of the evening sessions, that more information is needed by the AMA in order to formulate rules and flying patterns for RC work. We must all remember that unless you or your club writes to the AMA concerning rules, there should be no "gripes" if things aren't as you like at the next contest. What should be done about single and dual channel ships in the same contest? Do you believe that multi-channel reed equipment should be on a par with a simple single channel gas tube receiver? Or do you consider placing a rudder-only ship in the same class as one with rudder and engine control, even though both controls are actuated by a single channel receiver? These are a few of the questions that were discussed and will have to be answered by next year. Write your opinion to Walter Good, c/o AMA, 1025 Connecticut Ave., Washington, D. C.

Major Bourgeois mentioned a "club transmitter" set-up, whereby everyone uses the same heavy duty transmitter. This would eliminate transmitter interference.

Harold deBolt pressed for sending in suggestions on new rules. All sections of the country should be equally represented.

(*Continued on page* 46)

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★ BETTER PERFORMANCE ★ QUICKER STARTING

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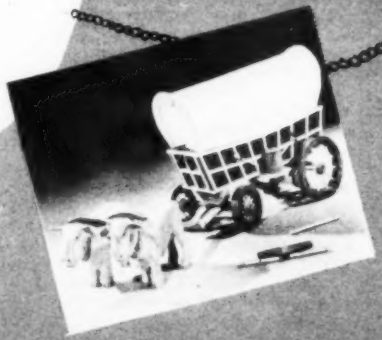

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EXCLUSIVE FEATURES:
Receiver Model BCR-3 Ultimate in fail-safe design. • 3 hard tubes, each doing its own job. • Constant carrier with audio tone. • Greatest relay current change—0 to 6 Ma thru 10,000 ohm relay. Signal increases Relay Current. • Greatest sensitivity—5 microvolts for reliable operation. • Hermetically sealed relay—no dust in contacts, no adjustments ever. • As easy to handle as your broadcast receiver: no tuning tricks, no band capacity, no overloading, non-critical antenna, tunes up with a pair of headphones. • Our own design of components, not available to other R/C manufacturers. • By far the most rugged equipment available. • Self contained arc suppression. • No tube selection required, any good tube works in any position. • Reliable performance thru a wide range of battery voltage and conditions. • May be used with any escapement.

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Crystal controlled on 27.255 megacycles. No license required.
Contains separate modulator tube and audio oscillator.
Uses short loaded 3 foot whip—no need for long unhandy antenna.
Range is more than adequate for any radio controlled flying.
Has radiation indicator on panel, simply tune for maximum output.

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Competitive prices
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From Fran McElwee, news of use of reed equipment and our two-tubers down Jersey way. It also seems as though a lot of the old timers among plane builders are trying their hand at RC boats.

Don Clark of the Washington, D. C. RC Club announced that their meeting place is, of all places, in a cemetery. However, everything is okay, except no dancing allowed. The club membership is around 63 and quite a few of Walt Good's receivers are in use down that way. Main feature is the training program for RC work. Amateur radio operators, electrical engineers and other experts in their respective fields give talks on their related subjects.

Flying Circuits will continue to handle the Eastern RC Convention for '54. Any questions on this can be addressed to Maynard Hill, 721 Broadway, East McKeesport, Pa.

TECHNICAL NOTES

This is the final installment of "debugging" radio equipment. Prior to the release of 27.255 mc for free-band operation, transmitters were of the self-excited types and used no crystals. By using the self-excited type of oscillator-transmitter, variations in battery voltage, placement of transmitters on the ground and the proximity of the antenna to surrounding objects were less critical and frequency output had a tendency to vary. Only the use of broad tuning super-regenerative receivers allowed reliable operation. Now we have crystal controlled transmitters and more selective receivers. This means we must keep both the transmitter and receiver closer in tune.

There are certain precautions that must be taken with the transmitter to secure maximum reliability. First, be sure the battery voltages are correct as specified by the manufacturer or designer. Use as large a set of batteries as possible or use a vibrator or dynamotor type of supply if possible. Battery voltage, temperature and external capacity fields are important factors for correct operation. Just because an oscillator is crystal controlled does not mean that it will remain on 27.255 mc under any condition.

Secondly, as mentioned before, body or ground capacities can alter performance. With a hand-held unit, the antenna is less than one-quarter wavelength and does not generally load the oscillator to its maximum. Also, the amount of coupling between the antenna pick-up coil and the tank coil is kept to a minimum. The best way to check a transmitter for radiation efficiency is by using a field strength meter. With this instrument, the antenna coupling can be adjusted to give peak RF output. In the case of a hand-held unit, it will also indicate in which position the transmitter should be held for peak output. One thing to remember is that even though a certain amount of RF energy is generated in the tank circuit, if the antenna is not properly adjusted, this useful power cannot be radiated. Next month we'll give a schematic for a sensitive field strength meter.

Placing the transmitter on the hood or top of a car when operating will provide a ground plane and thus give a more stable signal, unaffected by surrounding movements of the operator. In lieu of a car, which cannot always be driven to the flying site, a suitable substitute can be made as follows: place the transmitter on a 4 ft. sq. piece of chicken wire, or run 7 or 8 ft. lengths of No. 18 or 20 wire out from each corner of the transmitter box, being sure to make a metal to metal contact in either case.

When tuning the oscillator circuit, tune to the minimum dip on your meter and then adjust to give slightly less capacity on the tuning condenser. If your transmitter is not in a shielded case before being placed in the box, make a hole in the case of the box so that the tuning condenser can be reached after the unit is assembled. Since the presence

of the surrounding metal of the case may change operating characteristics, tuning should always be done with the unit in the case.

One sure way to "cook" a crystal is to run it at resonance without a load, such as would be supplied by the antenna or a light bulb and loop of wire. When a crystal oscillator is off resonance, the plate current is exceedingly high and the current through the crystal is low. Upon tuning to resonance, the plate current decreases and the crystal current increases. Then, upon placing a load on the tank circuit, the plate current increases again and the crystal current decreases. A crystal is very thin and fragile and excessive current can create enough heat to damage the unit. One simple way to check this is to put a No. 48 2V 60 mil flashlight bulb in series with the crystal. In this way, the lamp bulb acts as a fuse and an additional indication of resonance.

When troubleshooting, look for the following symptoms: no plate current—a broken connection or burned out tube; unable to obtain a dip in plate current when attempting to tune to resonance—bad tube or faulty crystal or shorted tank coil or shorted plate by-pass condenser; no signal when key is depressed—check keying switch or cable and also the first two items; very low or no output when antenna is attached—incorrect or inadequate antenna coupling and low battery voltages.

If a motor driven beep-box is used, be sure the power actuating the motor is adequate to give quick response and to prevent stalling of the motor. As the battery voltage decreases, the speed and torque also decrease, thus slowing down the impulse sent to the receiver. Needless to say, if the motor stalls, especially in a controlled position, results would be unsatisfactory, to say the least. If the sequencing switch is not motor driven, check the contacting surfaces if malfunctioning is suspected and be sure they are clean.

(Editor's Note—The contest report does not permit us to feature the usual questions and answers, news, and new items.) END

The FIRST Mulvihill

(*Continued from page 25*)

magazine "Aerial Age" since 1920, and avidly read all the articles on the famous Illinois Model Aero Club that led the entire model world in records. There were no magazines in those days like MODEL AIRPLANE NEWS and we depended on microscopic drawings of IMAC ships with very little dope in their construction. However, their articles on propeller and general design are good to this day.

Out of one of the 1922 issues, I think it was, I picked the tractor designed by Donovan Lathrop as my entry for the big race. It had a high aspect wing using the Fage and Collins 4 airfoil, a 10 in. diameter, 12 in. pitch prop, and weighed less than 2 oz. I was engaged that spring and summer in building a series of scale models for a department store "air race" window display, and did not order the material for my Lathrop until July. The order, placed with the old Wading River Model Co. in Brooklyn, N. Y., was well handled. I received the balsa wood (the first I ever had), Jap tissue and rubber, two weeks after the races were over in October! Hobby shops were then unknown. So I built a Lathrop out of white pine, wrapping tissue and 1/16 in. diameter reed, and the Ideal people rushed me the rubber power by Sept. 29. Rough as it was, the Lathrop flew pretty well in calm air, but I knew that no one in St. Louis had a ghost of a chance against the Windy City gang. Not having the ordinates on the Fage and Collins sections, I used a simple wing curve of bent bamboo ribs, which was single surfaced. (In 1925, I lost a "true Lathrop" in a

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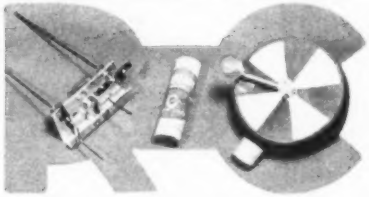

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Arriving mid-morning of Oct. 3, 1923, at Lambert Field, we were given as perfect an autumn day as one could ask for. The sky was a deep blue with a few alto-cumulus clouds present, and a moderate wind blowing from the west down the length of the field. The panorama of flight that greeted us was never to be equalled. Bertha Horchen, clad in gleaming white flying togs, was standing surfboard fashion, atop the center section of a JI Lincoln Standard, while her pilot husband looped at less than 1,000 ft. The sky was full of Spads, MB-3's, S6B's, and Lord knows what, flying from tree top level to 10,000 ft. or better. Pioneer Lawrence Sperry was getting the goat of the top ranking military fliers by doing everything they did in his little 20 ft. biplane Messenger. He was a captivating devil, and cries of "Here comes Sperry," "There goes Sperry" were heard everywhere.

Reporting to the judges stand under the home air race plylon, we were given a grand welcome. Bernard H. Mulvihill, Major Rudolph (Shorty) Schroeder, whose eyes froze, but opened in time in a world's altitude record, were among our hosts. We were given an hour or so for assembly and test hops, and I saw one St. Louis lad with a pusher having 3/8 in. diameter reed skids. He could have thrown it farther than it flew under power. During this test period, we were called by Lieut. Howard Littlefield of St. Louis to get our models in the shed as the big Barling Bomber, then the world's largest airplane, was expected to land.

In the shed such grand fellows as Walter Brock, who flew Bleriots and Moranes in England in 1911; Eddie Lang, who was destined for first place that day; Joe Lucas, Bob Jaros, Bert Pond, Paul S. Smith, and others were busy with final adjustments on their models, and also trying to help some of us from St. Louis as well. Through the door came a modest, mild mannered man whom I instantly recognized. He smiled and in a few words encouraged us to learn as much as we could about flying models and the science in general. He was the father of practical human flight, Orville Wright himself! This was the first of several meetings it was my pleasure to have with him. Now the huge Barling triplane with its six Liberty engines circled the field and landed. It was a mountain in its olive drab paint with large white letters, "U. S. Army," on each side of its streamlined fuselage. An Army Sperry Messenger taxied alongside to contrast the sizes of the largest and smallest planes in service. The Barling's engines opened and the tiny Messenger was flipped over on its back. Its pilot, an unknown Army airman, was unhurt.

With a band playing the stirring American Patrol March, our delayed contest finally got under way. We flew in the order of entry, with Walter Brock, Paul Smith, Ed

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Lange, Bert Pond and Joe Lucas starting in the order named. We had three official flights to make with the longest of the three flights taken as best time. Bob Jaros, who was to place second, made a fine flight of over a half mile in about three minutes. None of the IMAC models flew higher than 150 ft., but they were all steady and dependable. All had long motor runs, moderate pitch props, with about half the weight of each model being rubber. Considerable mathematics went into some, while others were expertly built from simple rules of design. They were the first balsa models any of us ever saw.

The wind got a little choppy and several St. Louis models, including my own, went to pieces in the air. Of course nothing happened to the sturdy Landers or Peolis. One of the latter, flown by Paul Oldendorph of St. Louis, looped its way through official trials and turned in a top of 17-4/5 seconds. Best time for the St. Louis group was made by Allyn Smith of Webster Groves, St. Louis County. He had a Funk and a Lander entered, and one of these flew 37-1/2 seconds. Lawrence Gerst made the best time from St. Louis City when his Peoli turned in 20-4/5 seconds.

Three hundred dollars in cash was offered. First prize was $100; second, $75, and so on down to $10 for seventh prize. Ed Lange won first prize and set a world's record for duration when his twin pusher flew four minutes, 22-3/5 seconds. His buddy, Bob Jaros, was second with three minutes, 59-1/5 seconds. The other prize winners were: Bert Pond, third with two minutes, 52 seconds, Joe Lucas, fourth, with two minutes, 14-2/5 seconds, Bill Schweitzer, fifth, with one minute, 53 seconds, Harry Wells, sixth, with one minute, 46-1/5 seconds, and Carl Rosmanith, seventh, with one minute, 40 seconds. Walter Brock came in eighth, and Paul Shiffler, ninth.

Walter Brock, gum chewing pioneer airman, started building models in 1907. His entry was a single canard with the rubber enclosed in a triangular sheet balsa fuselage nearly 5 ft. long. He told me later that he built it "just to keep the boys company." The statement to the press by Ed Lange was a fine example of the sportsmanship of the IMAC bunch. Here are his remarks: "Our club has been in existence 11 years and we have learned a lot about model airplanes. But we hope to get a lot of competition from St. Louis in the future. We will help your boys all we can, and we will get a licking from you yet, but you'll have to go some to give it to us." Lange, then 16, had been building models for six years, and got a lot of help from Jaros.

So ended the start of a new era for the model fraternity. Out of the 1923 show came new clubs, including the St. Louis Model Aviation Club, organized after of lot of effort by Paul Oldendorph, George Rutledge, yours truly, and others in 1925. These clubs carried on with no prizes for flights until the tremendous boost given flying by Col. Charles A. Lindbergh's famous non-stop flight to Paris in May, 1927. From then on, model flying grew to its present grand status. Some of the participants in the 1923 event may see this story, and I do hope they will drop me a letter for "Auld Lang Syne." END

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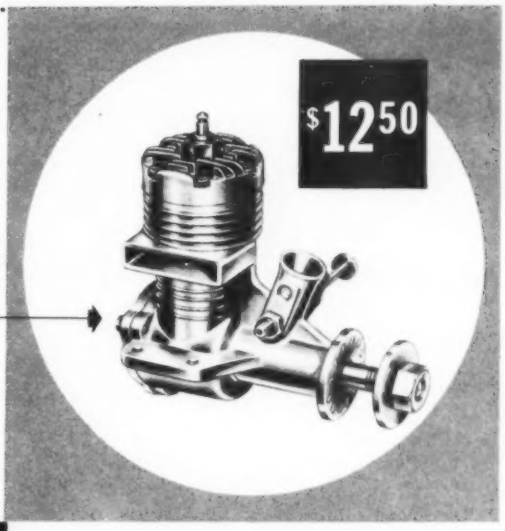

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page 16
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Engine Review

(*Continued from page 26*)

Not-so-obvious factors are the physical arrangement whereby every component can be manufactured with simple and foolproof tooling, and is assembled to assure perfect alinement and negligible heat distortion. As a result, correct replacement of parts or of complete unit assemblies is a simple matter for the amateur, and tuning and reworking by the enthusiast is expedited by the sound and logical methods of part location and rugged construction. It is no fallacy that simplicity is the essence of good design, and it is remarkable how truly the McCoy illustrates this maxim.

However, simplicity should not be construed to mean low cost. Ball bearings and piston rings are expensive items, and many manufacturers now feel that they take engine costs beyond the limit the average man will pay. But for those who appreciate fine engines for their own sake and demand top performance, the Macs are cheap at the price. We are indeed fortunate that McCoy found it possible to resume production after the disastrous fire which gutted their original factory.

A thoughtful examination of the Mac design inclines one to follow the line of reasoning that went into its conception. If the maximum energy to be derived from a given quantity of correctly proportioned gas and air mixture were represented by a little man with a big hammer, it would be necessary, in order to translate his hammer strokes into usable torque, to provide something for him to hit and arrange it to be there at the exact moment when his hammer was moving at its greatest speed and therefore possessing its maximum kinetic energy. The object he hit would therefore go up and down and would require a mechanism such as a conrod and crank to convert reciprocation into rotation, and in order to return the object to hitting position, would need sufficient momentum to complete the cycle. To sustain his effort, the little man would require feeling—regularly, quickly and easily.

If the mechanical member of this hypothesis were frictionless and incredibly strong, and the little man were a superman who could dispense with sleep, there would be no limit to the speed at which the whole fantasy could operate, other than the maximum rapidity with which he could eat and digest, and the speed at which food could be supplied. Which puts the conclusion of the McCoy designer in a nutshell.

So first he projects a strong, minimum friction mechanism which he houses in a rigid casting and then provides the largest conceivable ports and gas passages to carry food (mixture) to the cylinder with the least possible obstruction. It is then up to little man fuel to do his best, and in the Mac he certainly does it, so let us examine in detail the construction that turns that energy so rapidly into useful work.

The cylinder block, which incorporates the crankcase, exhaust stack, by-pass passage and cooling fins, is an aluminum sand casting, and a most excellent example of the art, in view of its small size and complex coring. Though perhaps not as pleasing to the eye as a pressure die casting, it is, on the other hand, somewhat stronger and less liable to fatigue fracture. For those interested, the sand casting method provides for the escape of air from the mold as it is displaced by pouring of the molten metal. Pressure die casting, however, involves a steel die which is necessarily pressure tight when closed, but which inevitably traps a quantity of air. Molten metal is injected into the die at very high pressure which causes the air to intermingle in the form of blow holes, which are usually below the finished surface of the casting and therefore undetected.

Various measures are taken to reduce this tendency but are seldom completely successful. Die casting also sets up a greater degree of thermal stress in the metal during cooling and often produces incipient flaws through localized premature cooling. None of this condemns die casting because it is allowed for in casting design, but we mention it to illustrate that sand castings are in no way old fashioned or inferior, whereas a good finish may be just that and no more.

It is a little unfortunate that the by-pass passage has a finish similar to the exterior, but in the Series 20 version of the .60, by-pass cross-sectional area is large enough for gas flow to be relatively unaffected by this slight roughness. We once went to considerable trouble to polish a .60 by-pass. The result was interesting: no appreciable difference!

A smooth machined finish is provided inside the crankcase, however, in order to locate precisely the front and backplate subassemblies, and accurately gangmilled faces insure that their flanges bolt up perfectly with the cylinder bore. A useful feature, incidentally, is the identical dimensioning of these faces from the bore center line, so that the front and backplates are interchangeable, thus permitting the exhaust stack to be switched to either side. However, the set-up as delivered, with exhaust on the left from the front, is preferable as gas flow through the crankcase conforms with direction of crank rotation and is thus slightly assisted.

Exhaust gases are allowed to escape through the ports in their natural direction which extends radially around 180° of the cylinder circumference, and are collected and ejected smoothly by a very wide stack which is machined internally for uniformity.

The cylinder proper is a hard steel sleeve or liner, ground concentrically inside and out to an interference fit in the aluminum block. Square by-pass and exhaust ports are accurately broached in the cylinder wall to leave only sufficient surface area for piston ring guidance and physical strength. The bore is finally honed round and parallel to a smooth finish. Where rings are used, square ports make the most efficient use of the available port height and area and contribute greatly to volumetric efficiency.

A flange at the top of the liner is recessed into the casting for depth location and is sandwiched by the sandcast, red anodized cylinder head which is retained by six Phillips head screws. Considerable attention has been given to combustion chamber design, and the head is beautifully contoured internally to promote balanced combustion and smooth scavenging. The 1/4/32 long reach plug hole is inclined slightly toward the by-pass side to induce a flushing action from the fresh charge, and deep, tapered cooling fins of highly efficient rather than purely attractive appearance dispose of the considerable waste heat.

Another rigid and heavy sandcasting forms the front bearing plate and houses the two crankshaft ballbearings. The bearing housings are separated by a portion of the casting which fits the 1/2 in. dia. crankshaft very closely in order to seal crankcase pressure. This means that there are three different diameter bores incorporated in the component, all of which have to be dead concentric for the shaft to revolve freely. The fact that it does speaks highly for the quality of machining in this engine.

It is attributable in no small part to the heavy crankshaft that the .60 will attain high rpm on very light props, as the momentum of the shaft makes for the lack of it in the prop. Some large engines which have all the earmarks of hot racing jobs are disappointing because they lack the necessary momentum potential. Rigidity is also of the utmost importance where ball bearings are used, as any whip, however slight, induces friction.

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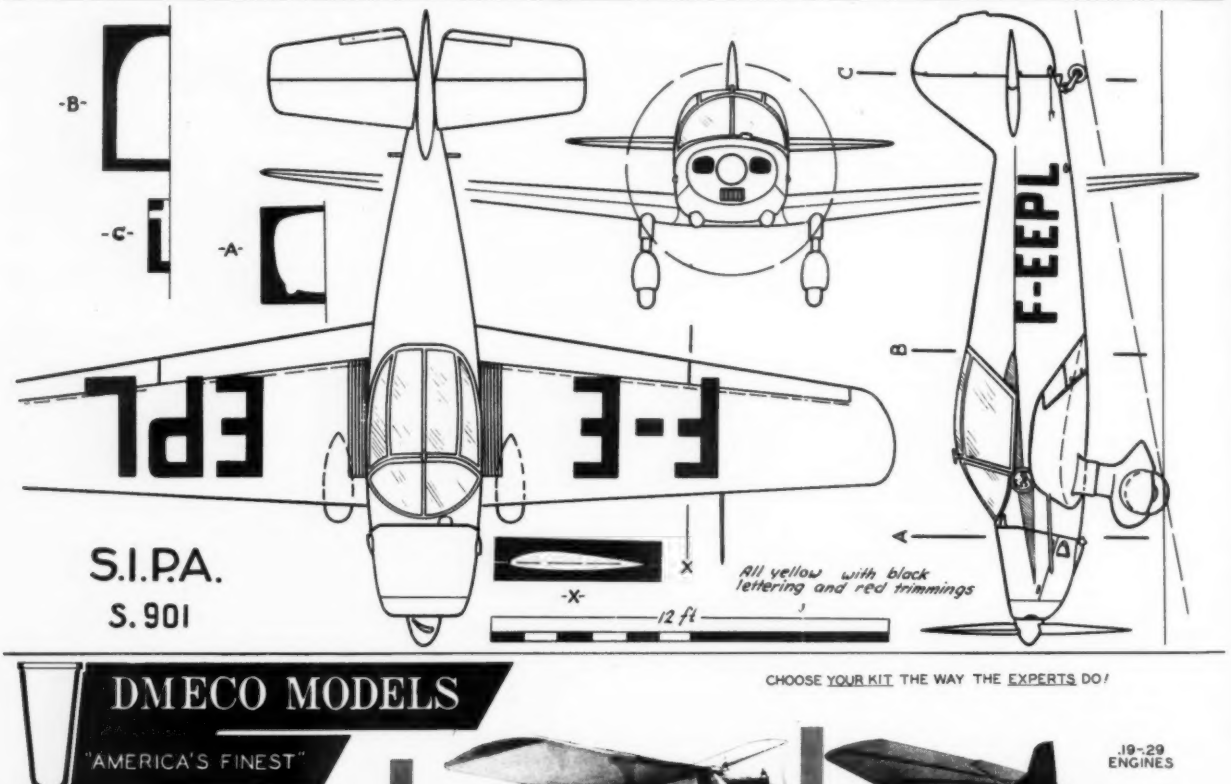

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The 1/2 in. dia. shaft and full crank disc with crescent type counterweight are therefore keys to performance. The crankpin has a ground finish and is an excellent fit in the bronze bushed conrod, through which it projects to engage with, and drive, the disc rotary valve. The front end of the shaft is threaded 5/16 in. and milled to receive a 1/16 in. square driving key. The aluminum prop driver forms a shaft extension and is counterbored for a special 5/16 in. steel sleeve nut. The outer end of the nut is tapped for standard 1/4 in. spinner attachment.

Incorporated in the backplate subassembly are the diecast electrolized chrome aluminum disc rotor with cast-in 3/16 in. shaft, a steel shim facing for the backplate valve face, the pressure diecast backplate itself with cast-in rotor shaft bearing, and the carburetor assembly.

The rotor shaft has a very fine thread machined at its tip which provides a purchase for the double lock washer retaining device, and enables end clearance to be set positively and easily.

The steel shim valve facing, which has tabs that engage in the intake segment to prevent rotation, is a recent innovation that greatly reduces any possibility of rotor seizure and reduces friction and wear.

The carburetor assembly comprises an aluminum venturi of very large diameter which screws into the backplate and may be rotated to any desired position, and a brass jet and brass needle valve assembly. The needle locking device is a taper tapped nut which screws onto the split threaded housing, and provides friction according to the tightness of the nut. This is very compact and positive and a great improvement over the earlier ratchet device.

The conrod is a sturdy aluminum drop forging with bronze bushed crankpin bearing and excellent fit and finish.

A tubular, fully floating ground steel wrist pin with aluminum end pads completes the link with the piston, which is of cast aluminum. The wrist pin bosses are reamed to high finish and close fit on the pin and have strengthening and cooling webs extending into the interior of the piston crown, and two cast iron piston rings with lapped faces complete the assembly.

As we said, starting the Macs is extremely easy with the right technique, and the test engine was no exception. Having determined that the fuel line is full right up to the jet, two or three choked flips to prime the crankcase are followed by a few drops of fuel injected through the exhaust port onto the by-pass side of the piston with a suitable pump nozzle. It is important that the fuel gets to the by-pass side of the piston so that by-pass draught will atomize it. Give a couple of sharp flips to break the prime up and connect the battery. She'll fire for sure and usually start. The next flip will invariably upset the neighbors.

As the Series 20 McCoy .60 is widely used by speed fliers, we intend to cover its finer points in a future article devoted to tuning for speed.

TEST: McCoy Redhead .60 Series 20

Plug: McCoy Hot Point as supplied, 1-1/2 volts to start; Fuel: Supersonic 1000; Running Time Prior to Test: 1/2 hour; Bore: .940 in.; Stroke: .875 in.; Weight: 14-1/4 oz. (with prop driver and nut).

Power Prop	*RPM*
12 x 8	12,600
12 x 6	13,500
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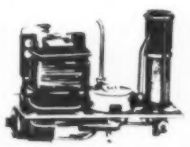

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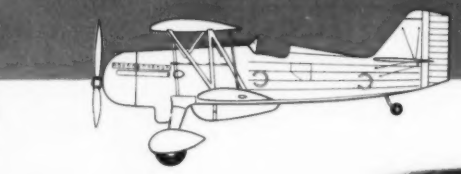

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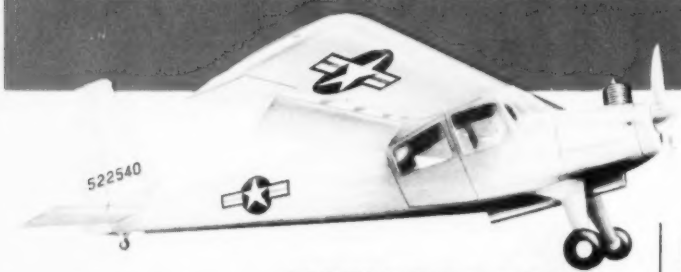

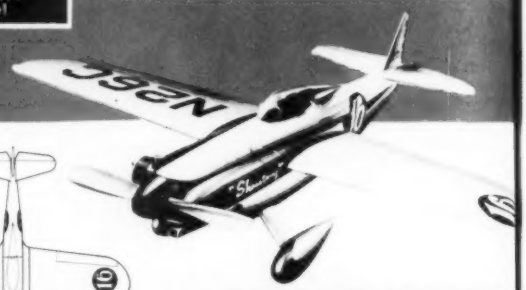

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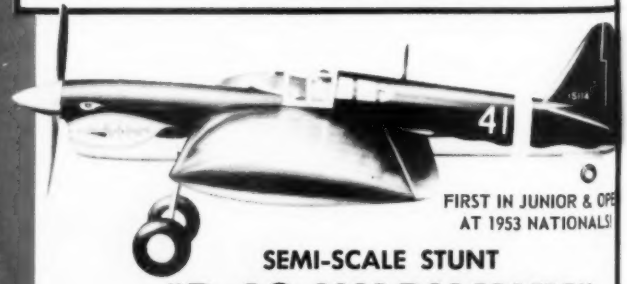

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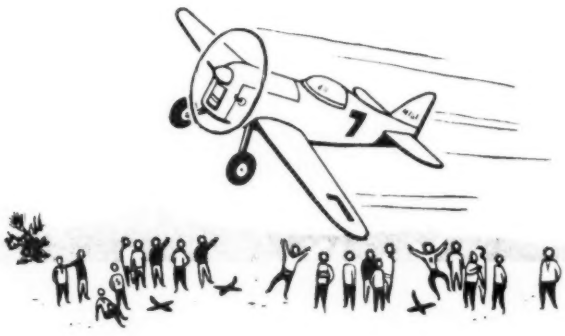

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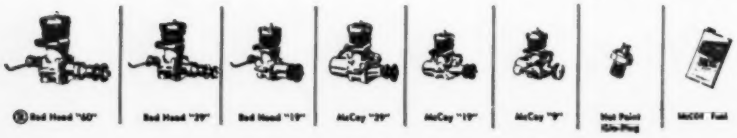

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